A Stereo-Atlas of Ostracod Shells

edited by R. H. Bate, D. J. Horne, J. W. Neale,
and David J. Siveter

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Dr R.H. Bate, SSI (UK) Ltd., Tannery House, Tannery Lane, Send, Woking, Surrey GU23 7EF.
Dr D.J. Horne, Department of Geology, City of London Polytechnic, Walburgh House, Bigland Street, London E1 2NG.
Prof. J.W. Neale, Department of Geology, The University, Hull HU6 7RH.
Dr David J. Siveter, Department of Geology, The University, Leicester LE1 7RH.

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Instructions to Authors

Contributions illustrated by scanning electron micrographs of Ostracoda in stereo-pairs are invited. Format should follow the style set by the majority of papers in this issue. Descriptive matter apart from illustrations should be cut to a minimum; preferably each plate should be accompanied by one page of text only. Blanks to aid in mounting figures for plates may be obtained from any one of the Editors or Editorial Board. Completed papers should be sent to Dr David J. Siveter.

The front cover shows a right valve (927 μm long) of *Newnhamia petiola* De Deckker, 1979, in life position; from the type locality, Pine Tree Creek Lagoon, near Hughenden, Queensland, Australia. This species swims upside down and can stick to the water surface tension with its flat ventral area.

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ON *EUCYTHERE DECLIVIS* (NORMAN)

by David J. Horne & John E. Whittaker
(City of London Polytechnic & British Museum (Natural History), London)

Genus *EUCYTHERE* Brady, 1868

1866 *Cytheropsis* gen. nov. G. O. Sars, *Forh. VidenskSelsk. Krist.*, **1865**, 57–58 (= junior homonym of *Cytheropsis* M'Coy, 1849).
1868 *Eucythere* nom. nov. G. S. Brady, *Trans. Linn. Soc. Lond.*, **26**, 429.

Type-species: *Cythere declivis* Norman, 1865 (subsequent designation by Brady & Norman, *Scient. Trans. R. Dubl. Soc.*, ser. 2, **4**, 178, 1889)

Diagnosis: Carapace sub-triangular in lateral view with greatest height at or in front of mid-length. Anterior margin broadly rounded, dorsal and ventral margins strongly convergent posteriorly. Greatest width at or behind mid-length. External surface smooth or weakly ornamented. Inner lamella broad anteriorly, narrow ventrally and posteriorly. Anterior and posterior vestibula present. Marginal pore-canals straight, usually 10–15 anteriorly and about 3 posteriorly. Hinge lophodont, running from about mid-length to the posterior margin. Four adductor muscle-scars in an arcuate row, the lowermost being relatively large and crescent-shaped. Frontal scar relatively large, asymmetrically U- or V-shaped. Prominent fulcral point. Normal pores conspicuous, sieve-type. Dimorphic, male more elongate than female. Antennula with five articulated podomeres. Maxillular palp and masticatory processes slender, innermost one much reduced. Legs slender. Male brush-shaped organ relatively large, spatulate, with numerous distal setae. Male copulatory appendage relatively small.

Explanation of Plate 12, 2

Fig. 1, ♂ RV, ext. lat. (paralectotype, **1984.194**, 590 μm long); fig. 2, ♀ RV, ext. lat. (lectotype, **1984.193**, 620 μm long); fig. 3, ♀ LV, int. lat. (**1.13.33**, 610 μm long).
Scale A (100 μm; × 95), figs. 1–3.

Eucythere declivis (Norman, 1865)

1865 *Cythere declivis* sp. nov. A. M. Norman, *in*: G. S. Brady (Ed.), *Nat. Hist. Trans. Northumberland and Durham*, **1** (1865–1867), (1), 16–17, pl. 5, figs. 9–12.
1865 *Cythere declivis*, Norman (n.sp.); A. M. Norman, *in* : G. S. Brady, *Rept. Brit. Assoc. Adv. Sci.*, **1864** : 192 (identical description to above but without illustrations).
?1866 *Cytheropsis tenuitesta* sp. nov. G. O. Sars, *Forh. VidenskSelsk. Krist.*, **1865**, 59.
1868 *Eucythere declivis* (Norman); G. S. Brady, *Trans. Linn. Soc. Lond.*, **26**, 430–431 (*pars*), pl. 27, figs. 22–26, 54–55 only (*non* pl. 25, figs. 49–50, pl. 27, figs. 52–53).
non 1894 *Eucythere declivis* (Norman); G. W. Müller, *Fauna Flora Golf. Neapel.*, **21**, 363, pl. 29, figs. 5, 13.
?1925 *Eucythere declivis* (Norman); G. O. Sars, *An account of the Crustacea of Norway*, **9**, *Ostracoda*, pts. 9, 10, 163–164, pl. 75, fig. 2, Bergen Museum.
1957 *Eucythere declivis* (Norman); C. W. Wagner, *Sur les Ostracodes du Quaternaire récent des Pays-Bas et leur utilisation dans l'étude géologiques des dépôts holocènes*, 43–44 (*pars*), pl. 15, fig. 5 only (*non* figs. 1–4), Mouton & Co., The Hague.
1977 *Eucythere declivis* (Norman); A. Rosenfeld, *Meyniana*, **29**, 19–20, pl. 3, fig. 42.

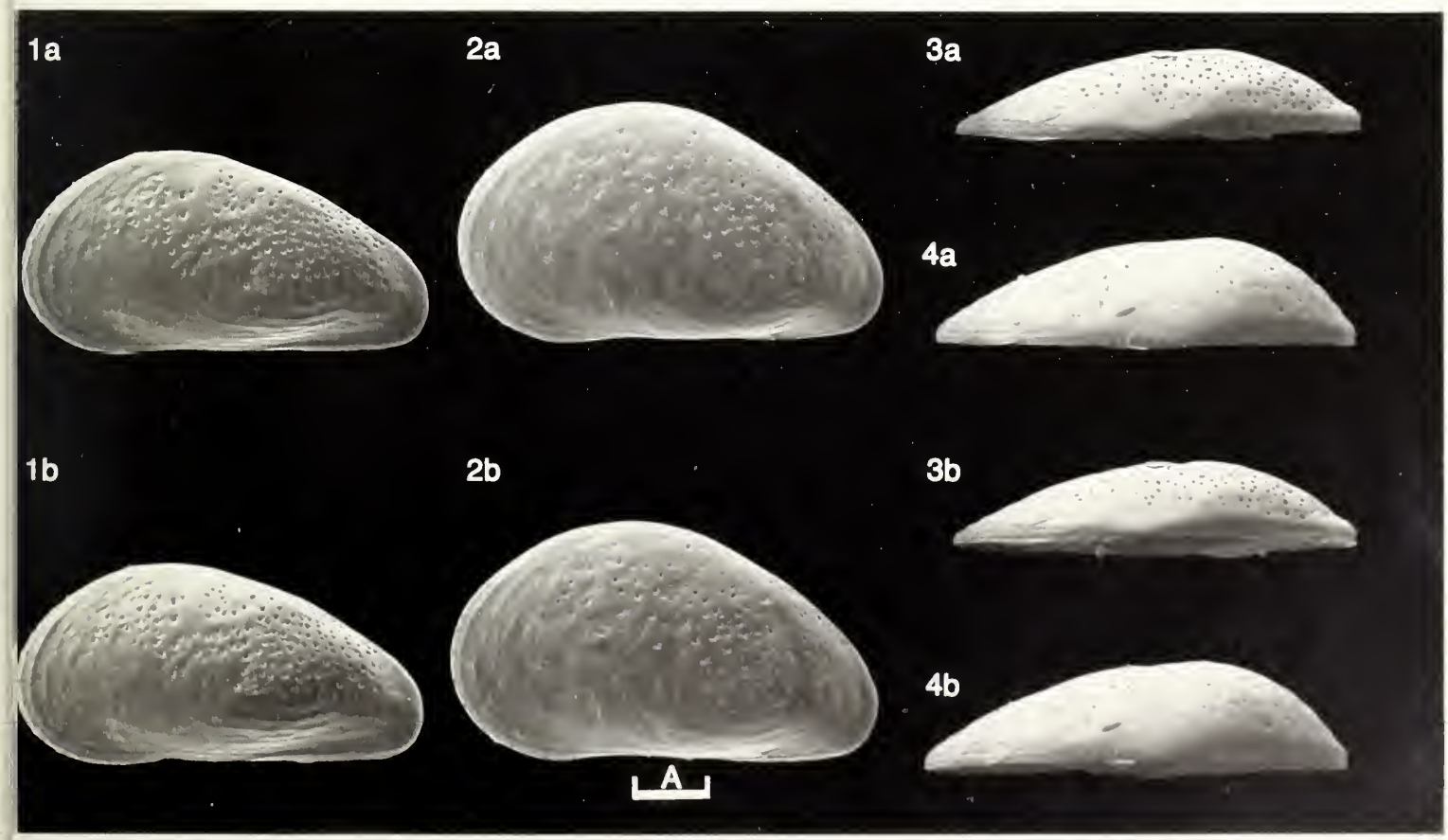
Lectotype: Brit. Mus. (Nat. Hist.) no. **1984.193**, ♀ RV + LV.
[Paralectotype: Brit. Mus. (Nat. Hist.) no. **1984.194**, ♂ RV + LV].
Type locality: Plymouth, SW England (approx. lat. 50°23′N, long. 04°09′W); Recent.
Figured specimens: Brit. Mus. (Nat. Hist.) nos. **1984.194** (paralectotype, ♂ RV : Pl. **12**, 2, fig. 1), **1984.193** (lectotype, ♀ RV: Pl. **12**, 2, fig. 2, Text-fig. 1a), **1984.195** (♀ car. + appendages; appendages: Text-figs. 1b–c), **1984.196** (♂ car. + appendages; LV: Pl. **12**, 4, fig. 1; RV: Pl. **12**, 4, fig. 3; appendages: Text-figs. 1g-h). Hancock Mus., University of Newcastle, no. **1.13.33** (♀ car. + appendages; LV: Pl. **12**, 2, fig. 3, Pl. **12**, 4, fig. 2; RV: Pl. **12**, 4, fig. 4; appendages: Text-figs. 1d–f).

The lectotype and paralectotype were taken from slide no. **1911.11.8 M 3496** in the Norman collection, labelled "*Eucythere declivis* (Norman) Types, Plymouth, Mr Barlee". Nos. **1984.195** and

Explanation of Plate 12, 4

Figs. 1, 3, ♂ (**1984.196**, 560 μm long); fig. 1, LV, ext. lat.; fig. 3, RV, dors.; figs. 2, 4, ♀ (**1.13.33**, 610 μm long): fig. 2, LV, ext. lat.; fig. 4, RV, dors.
Scale A (100 μm; × 95), figs. 1–4.

1a
2a
3a
1b
2b
3b
A


1a
2a
3a
4a
1b
2b
3b
4b
A

Figured specimens: (contd.) **1984.196**, both from the North Sea off Aberdeen (approx. lat. 57°N, long. 00°) were provided by J. E. Robinson. Hancock Mus. no. **1.13.33**, from 8 miles off the Durham Coast between Seaham and Sunderland (approx. lat. 54°55′N, long. 01°10′W), depth 20–30 fath. (36–55 m), was taken from slide no. **2.11.36** in the Brady collection.

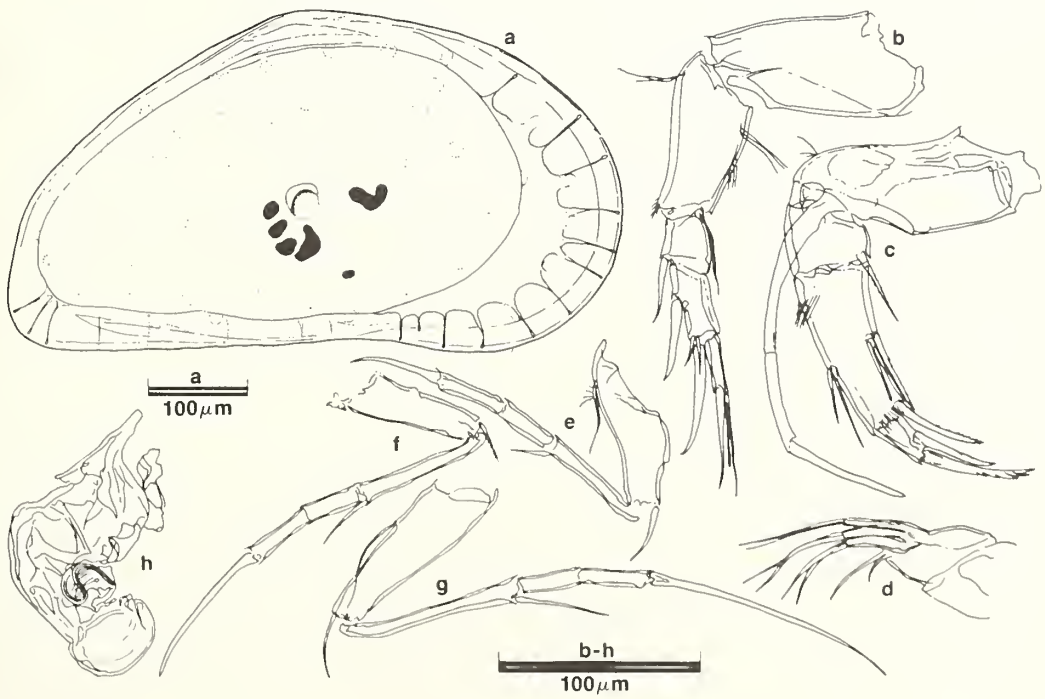
Diagnosis: Carapace finely pitted in dorsal and median areas, smooth or with faint concentric ribbing in anterior and ventral areas. Posteroventral marginal area strongly compressed in male, weakly so in female. Anterior vestibulum relatively broad. Distal process of male copulatory appendage relatively large, semicircular.

Remarks: In his "Monograph of the Recent British Ostracoda" Brady (1868, *op. cit.*) recognised two forms in addition to the true *E. declivis*. One of these he described as *E. anglica* sp. nov. in the appendix of the monograph, while the other was later described by Brady & Robertson (*Ann. Mag. nat. Hist.*, ser. 4, **3**, 370–371, pl. 21, figs. 12–14, 1869) as *E. declivis* var. *prava*; both taxa have been largely ignored by subsequent authors. Our examination of their respective type specimens in the Hancock Museum has shown conclusively that they are both valid species (see Horne & Whittaker, *Stereo-Atlas of Ostracod Shells* **12**, 7–10 and **12**, 11–14, 1985). *E. anglica* is less elongate and more strongly pitted than *E. declivis*, while *E. prava* is easily distinguished by its posteromedian sulcus. The type slides of *E. declivis* in the Norman collection contain specimens of both *E. declivis* and *E. prava*. We have chosen as a lectotype and paralectotype two specimens which correspond closely to the original description and illustrations of *E. declivis*.

The Mediterranean records of *E. declivis* of G. W. Müller (1894, *op. cit.*) and most subsequent authors may be referred to *Eucythere curta* Ruggieri, 1975 (*Revta esp. Micropaleont.*, **6**, 433–434, fig. 6; *q.v.* for full synonymy). As far as we can ascertain *E. declivis* does not live in the Mediterranean.

The form illustrated by Sars (1925, *op. cit.*) appears to lack the posteroventral compressed area exhibited by British specimens and also differs in minor details of carapace outline and the male copulatory appendage; we are therefore in some doubt as to whether it is conspecific with *E. declivis*. Of Wagner's (1957, *op. cit.*) illustrations of *E. declivis*, only one can be confidently assigned to that species, while the others should be referred to *E. argus* (Sars, 1866).

Distribution: Records of *E. declivis* require careful re-examination in the light of the above-mentioned confusion with other species. It appears to be fairly common in marine sublittoral waters around Britain and in the North Sea. Rosenfeld (1977, *op. cit.*) recorded it in the Baltic Sea in salinities of 25–30‰.



Text-fig. 1. *Eucythere declivis*. a: ♀ RV seen in transmitted light (lectotype, **1984.193**). b–h: appendages; b, c, ♀ (**1984.195**), b: antennula, c: antenna; d-f, ♀ (**1.13.33**), d: maxillula, e: first leg, f: second leg; g, h, ♂ (**1984.196**), g: third leg, h: copulatory appendage.

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ON *EUCYTHERE ANGLICA* BRADY

by David J. Horne & John E. Whittaker
(City of London Polytechnic & British Museum (Natural History), London)

Eucythere anglica Brady, 1868

1868 *Eucythere declivis* (Norman); G. S. Brady, *Trans.Linn.Soc.Lond.*, **26**, (*pars*), 431, pl. 25, figs. 49, 50 only (*non* 430, pl. 27, figs. 22-26, 52-55) (*non Cythere declivis* Norman, 1865).

1868 *Eucythere anglica* sp.nov. G. S. Brady, *Trans.Linn.Soc.Lond.*, **26**, 475, pl. 25, figs. 49, 50.

Lectotype: Hancock Museum, University of Newcastle, no. **1.54.20**, ♀ RV.
[Paralectotype: Hancock Museum no. **1.54.21**, ♂ RV].

Type locality: Off Seaham, Durham coast, NE England (approx. lat. 54° 50′N, long. 01° 10′W); Recent.

Figured specimens: Hancock Mus. nos. **1.54.20** (lectotype, ♀ RV: Pl. **12**, 8, fig. 2), **1.54.21** (paralectotype, ♂ RV: Pl. **12**, 8, fig. 1, Pl. **12**, 10, fig. 3), **1.54.22** (♀ car. + appendages; LV: Pl. **12**, 8, fig. 3, Pl. **12**, 10, fig. 1, Text-fig. 1b; RV: Pl. **12**, 10, figs. 2, 4, Text-fig. 1a; appendages: Text-fig. 1c-d). Nos. **1.54.20** and **1.54.21** were taken from slide no. **1.02.35** in the Brady collection, labelled "*Eucythere anglica*, off Seaham". **1.54.22** is from off Hartlepool, NE England (approx. lat. 54° 41′N, long. 01° 08′W) and was taken from slide no. **2.13.04** in the Brady collection.

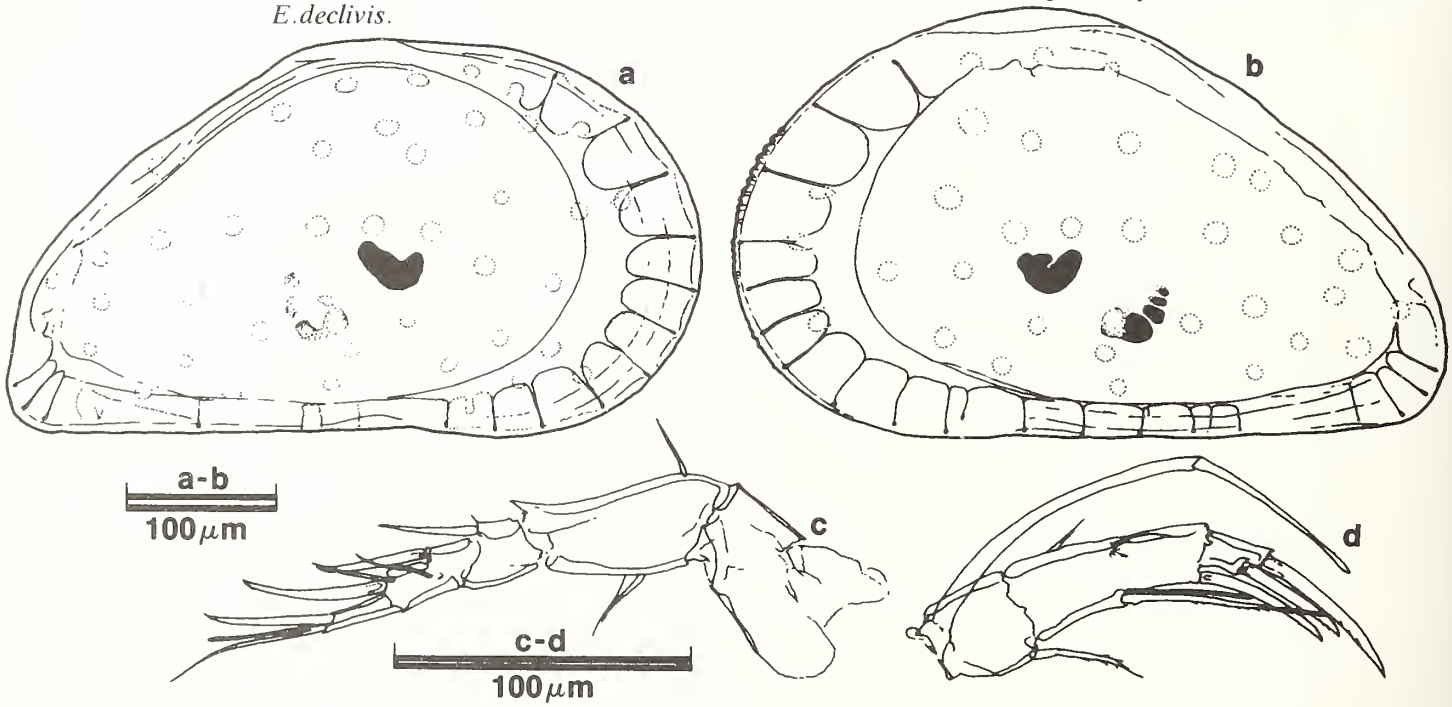
Diagnosis: Carapace small (< 500 μm long), conspicuously pitted in median and dorso-median areas, with concentric ribbing in the anterior and ventral marginal areas. Posteroventral corner somewhat compressed. Anterior vestibulum relatively broad.

Remarks: Brady (1868, *op.cit.*) initially mentioned and illustrated this species as a form of *E.declivis*, but then described it as a new species in the appendix of the same publication. It is smaller, less elongate and more strongly pitted than *E.declivis* (see Horne & Whittaker, *Stereo-Atlas of Ostracod Shells* **12**, 1-6, 1985).

Explanation of Plate 12, 8

Fig. 1, ♂ RV, ext.lat. (paralectotype, **1.54.21**, 460 μm long); fig. 2, ♀ RV, ext.lat. (lectotype, **1.54.20**, 480 μm long); fig. 3, ♀ LV, ext.lat. (**1.54.22**, 480 μm long). Scale A (100 μm; × 125), figs. 1-3.

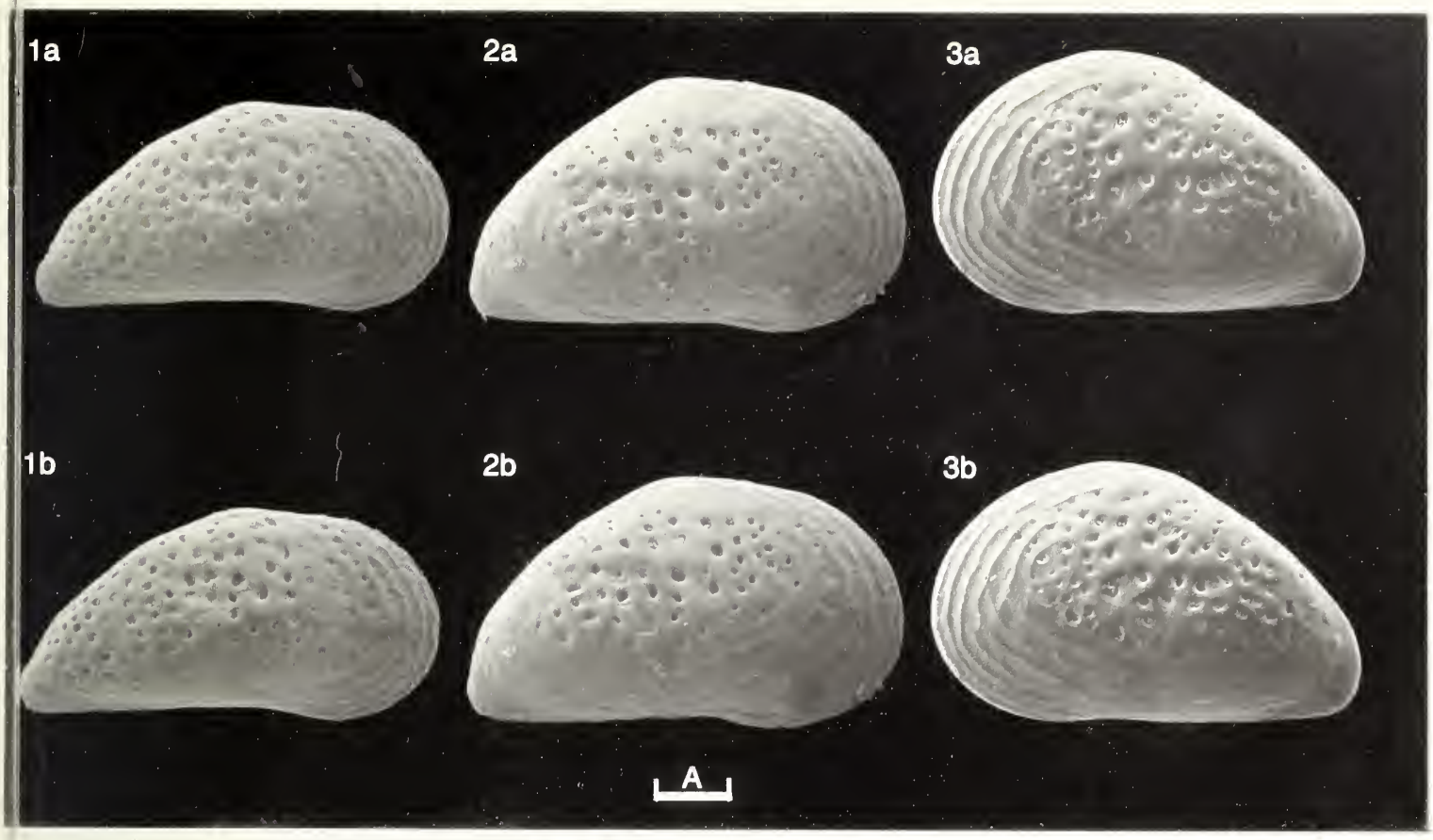
Distribution: The Brady collection contains several examples of this species from marine sublittoral localities around the British Isles. The absence of more recent records is probably due to confusion with *E.declivis*.

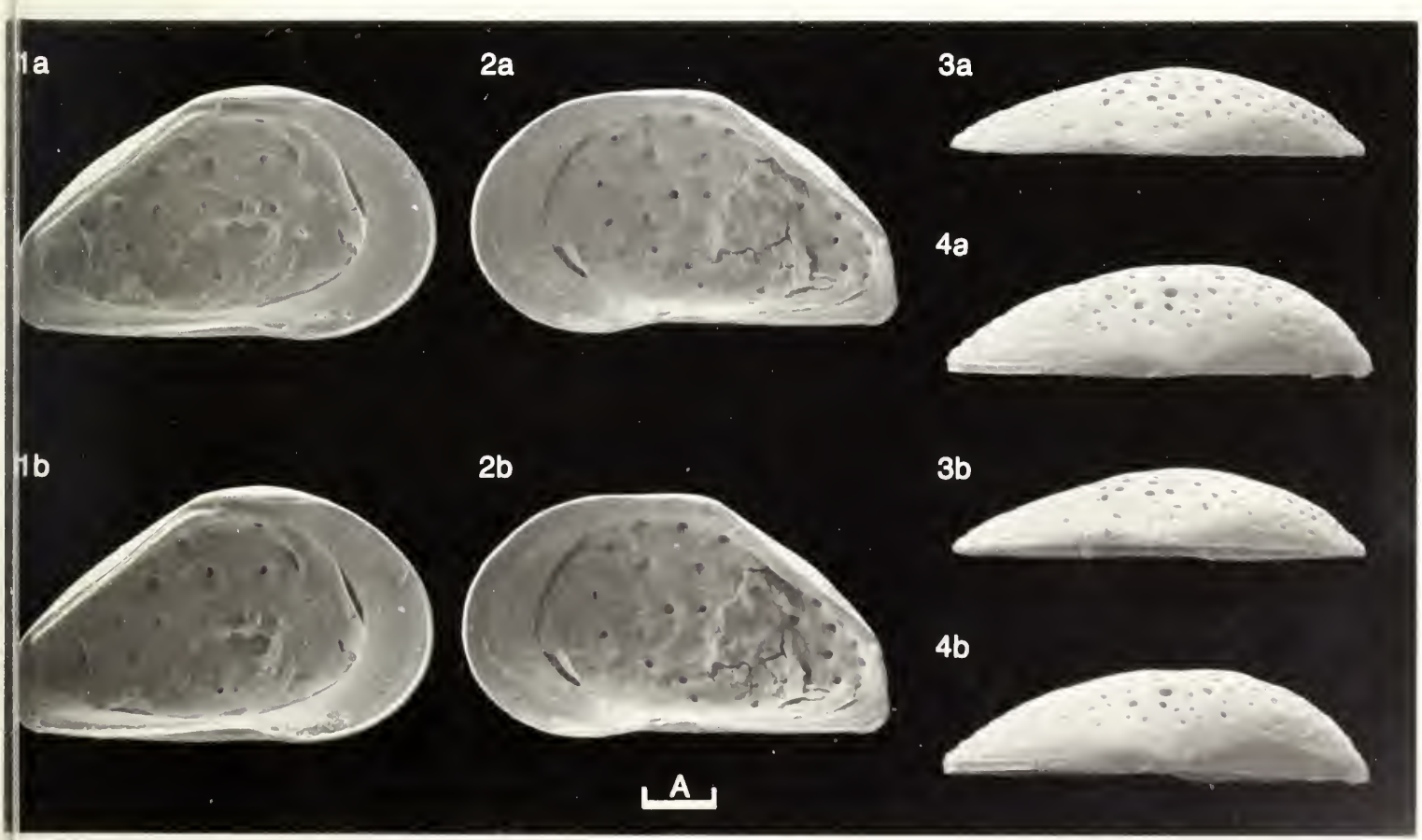


Text-fig. 1, ♀ valves + appendages, **1.54.22**; a-b: RV & LV drawn in transmitted light; c: antennula; d: antenna.

Explanation of Plate 12, 10

Figs. 1, 2, 4, ♀ (**1.54.22**, 480 μm long): fig. 1, LV int.lat.; fig. 2, RV int.lat.; fig. 4, RV dors.; fig. 3, ♂ RV, dors. (paralectotype, **1.54.21**, 460 μm long). Scale A (100 μm; × 125), figs. 1-4.


1a
2a
3a
1b
2b
3b
A


1a
2a
3a
4a
1b
2b
3b
4b
A

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ON *EUCYTHERE PRAVA* BRADY & ROBERTSON

by David J. Horne & John E. Whittaker
(City of London Polytechnic & British Museum (Natural History), London)

Eucythere prava Brady & Robertson, 1869

1868 *Eucythere declivis* (Norman); G. S. Brady, *Trans.Linn.Soc.Lond.*, **26**, 430 (*pars*), pl. 27, figs. 52-53 only (*non* pl. 27, figs. 22-26, 54-55, pl. 25, figs. 49-50) (*non Cythere declivis* Norman, 1865).

1869 *Eucythere declivis* var.*prava*; G. S. Brady & D. Robertson, *Ann.Mag.nat.Hist.*, (ser. 4), **3**, 370-371, pl. 21, figs. 12-14.

Lectotype: Hancock Museum, University of Newcastle, no. **1.39.33**, ♀ carapace.

Type locality: Westport Bay (= Clew Bay), Co. Mayo, W Ireland (approx. lat. 53° 50′N, long. 09° 40′W); Recent.

Figured specimens: Hancock Mus. nos. **1.39.33** (lectotype, ♀ car.: Pl. **12**, 12, fig. 1), **1.39.34** (♂ car + appendages; LV: Pl. **12**, 12, fig. 3, Text-fig. 1a; RV: Pl. **12**, 14, fig. 2; copulatory appendages: Text-fig. 1c-d), **1.39.35** (♂ car. + appendages; appendages: Text-fig. 1e-f). Brit. Mus. (Nat.Hist.) no. **1984.187** (♀ car.; LV: Pl. **12**, 12, fig. 2, Pl. **12**, 14, figs. 1, 4, Text-fig. 1b; RV: Pl. **12**, 14, fig. 3). The lectotype was taken from slide no. **2.03.16** in the Brady collection. Hancock Mus. nos. **1.39.34** and **1.39.35**, from off St. Mary's, Isles of Scilly (approx. lat. 49° 55′N, long. 06° 15′W), depth 20 fath. (36m), were taken from slide no. **2.12.40** in the Brady collection. Brit.Mus. (Nat.Hist.) no. **1984.187**, from the English Channel, S of the Eddystone Lighthouse (approx. lat. 50° 02′N, long. 04° 22′W), depth approx. 75m, was provided by S. Sturrock.

Diagnosis: Posterior half of carapace with an irregular longitudinal posteromedian sulcus, anterior half faintly reticulate. Surface smooth or very finely pitted. Anterior vestibulum relatively narrow. Male copulatory appendage with a lemon-shaped distal process.

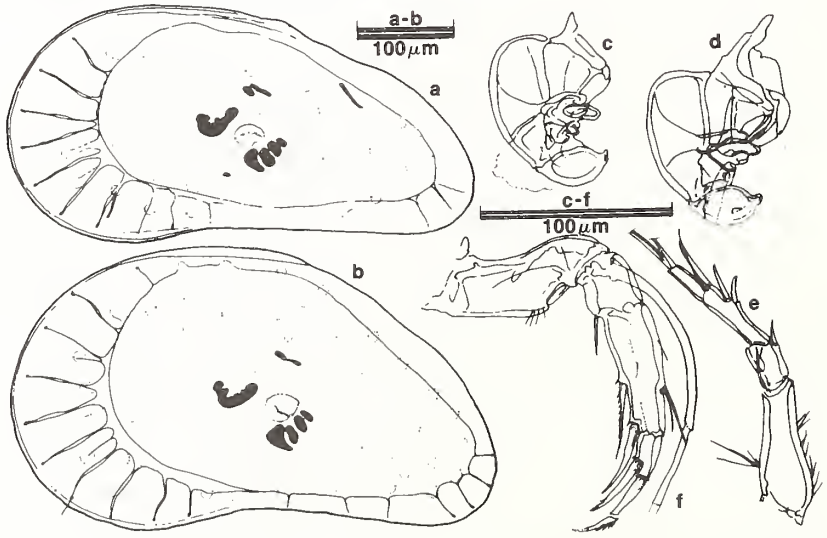
Remarks: Brady (1868, *op.cit.*) originally mentioned and illustrated this species as a form of *E.declivis* (Norman, 1865) (see Horne & Whittaker, *Stereo-Atlas of Ostracod Shells* **12**, 1-6, 1985); it was later

Explanation of Plate 12, 12

Fig. 1, ♀ car., rt.lat. (lectotype, **1.39.33**, 510μm long); fig. 2, ♀ LV, ext.lat. (**1984.187**, 500μm long); fig. 3, ♂ LV, ext.lat. (**1.39.34**, 480μm long). Scale A (100μm; ×125), figs. 1-3.

Remarks (contd.): formally described as a variety of *E.declivis* by Brady & Robertson (1869, *op.cit.*) and is here raised to specific status. *E.prava* is easily distinguished from other *Eucythere* species by its characteristic postero-median sulcus.

Distribution: *E.prava* appears to be fairly widespread in marine sublittoral waters around the British Isles (Brady and Norman collections and herein).

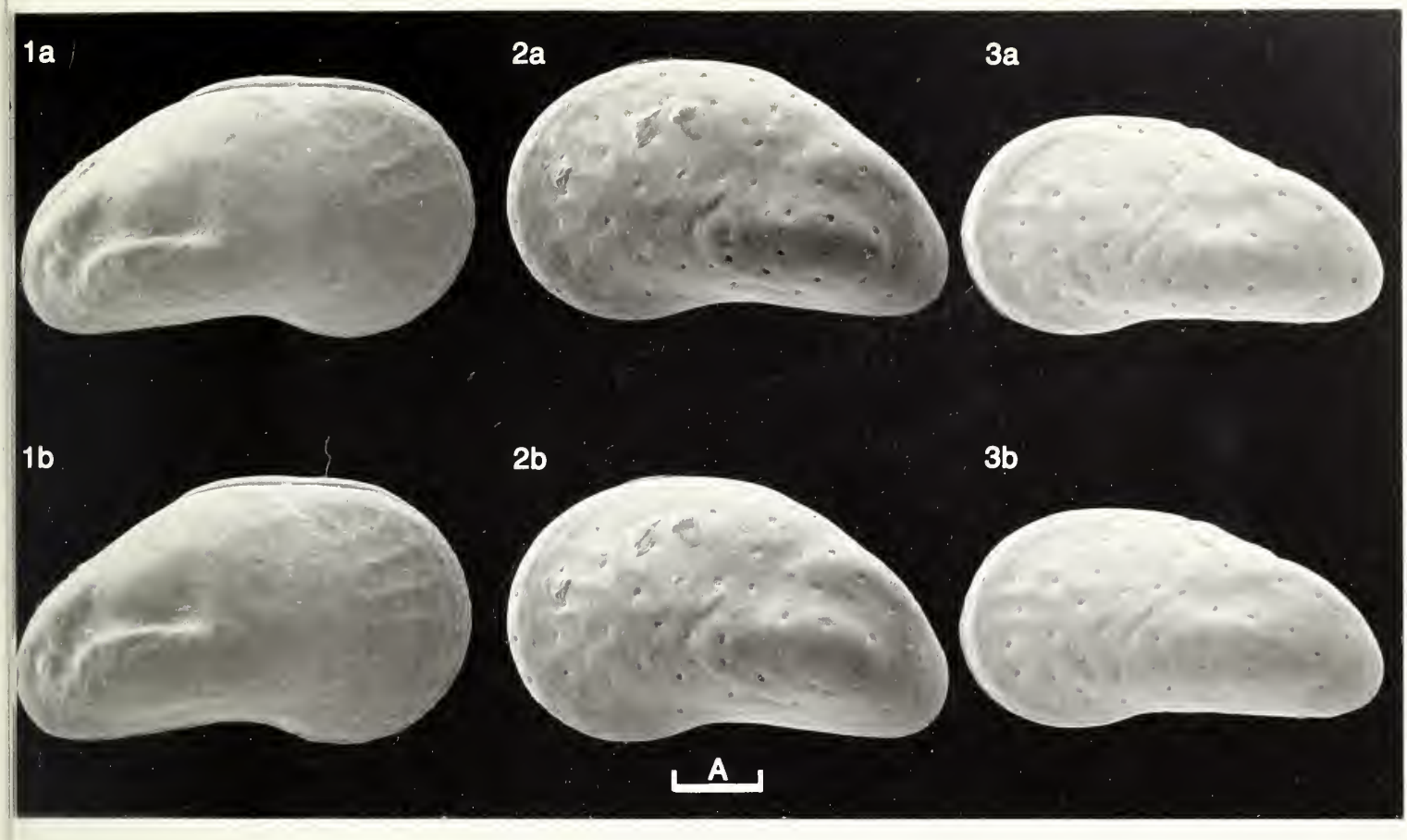


Text-fig. 1. *Eucythere prava*. a-b: valves seen in transmitted light; a: ♂ LV (**1.39.34**); b: ♀ LV (**1984.187**). c-f: appendages; c, d: ♂ copulatory appendages (**1.39.34**); e, f: ♂ antennula and antenna (**1.39.35**).

Explanation of Plate 12, 14

Figs. 1, 3, 4, ♀ (**1984.187**, 500μm long): fig. 1: LV, ext. lat.; fig. 3, RV, dors.; fig. 4, LV, ext.lat., detail of median area showing external trace of central muscle-scar field; fig. 2, ♂ RV, dors. (**1.39.34**, 480μm long).

Scale A (100μm; ×125), figs. 1-3; scale B (50μm; ×350), fig. 4.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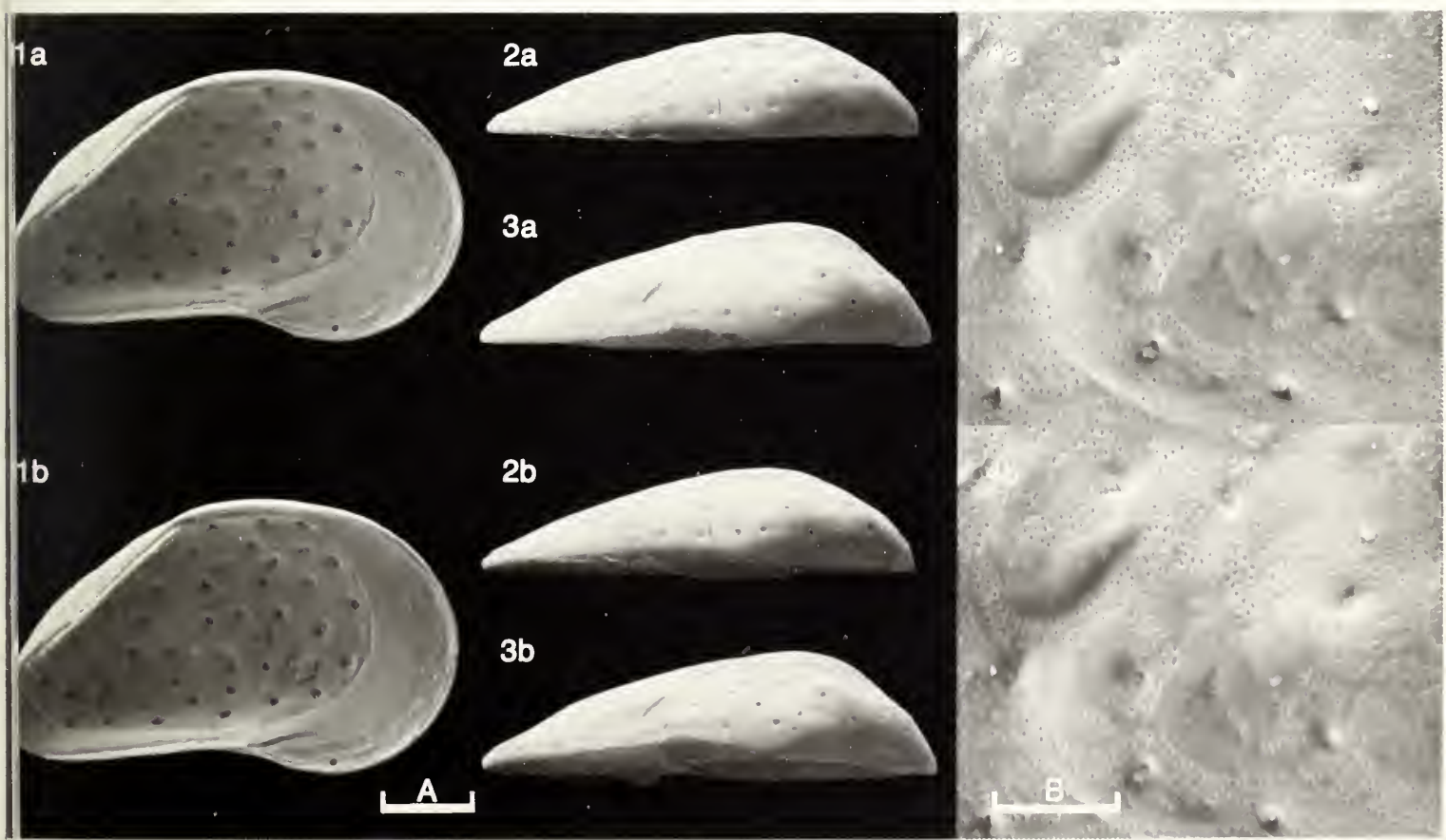
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595.336.13 (113.313) (430.1 : 161.008.54) : 551.35 + 552.55

ON *PIRETIA COMMASULCATA* SCHALLREUTER sp. nov.

by Roger E. L. Schallreuter
(University of Hamburg, German Federal Republic)

Piretia commasulcata sp. nov.

Holotype: Geologisch-Paläontologisches Institut und Museum, University of Hamburg (**GPIMH**), no. **2938**; ♀ LV, anterodorsally and posterodorsally incomplete.
[Paratypes: **GPIMH** nos. **2939-2942**].

Type locality: Upper Harjuan (upper Ordovician) Öjlemyrflint erratic boulder no. Sy60 of the upper Kaolinsand (lower Pleistocene) from near Braderup, Isle of Sylt (N Frisian Is, N Sea), West Germany; lat. 54° 56′N, long. 8° 21′E.

Derivation of name: Alluding to the comma-shaped sulcus.

Figured specimens: **GPIMH** nos. **2938** (holotype, incomplete ♀ LV: Pl. **12**, 16, figs. 1, 3), **2939** (paratype, juv. LV: Pl. **12**, 16, fig. 2, Pl. **12**, 18, fig. 1), and **2940** (paratype, nearly complete juv. RV: Pl. **12**, 18, fig. 2). All specimens are from the type locality; boulder collected by Ulrich von Hacht (Hamburg) in 1978.

Explanation of Plate 12, 16

Figs. 1, 3, anterodorsally and posteriorly incomplete ♀ LV (holotype, **GPIMH 2938**, 683 μm long): fig. 1, ext. lat.; fig. 3, ext. anterovent.
Fig. 2, juv. LV, ext. vent. (paratype, **GPIMH 2939**, 585 μm long).
Scale A (100 μm; × 110), figs. 1, 3; scale B (100 μm; × 170), fig. 2.

Diagnosis: Species of *Piretia* with short, comma-shaped sulcus near the dorsal margin. Preadductorial node bulb-like but flattish. Shape ('Gestalt') rather long to long; shape of domicilium very long. A narrow, low, ridge-like plica occurs along the dorsal border. Velum forms a ridge or narrow flange which terminates posteroventrally in a short spine. Female has a very strongly convex dolon forming a false brood pouch. A ridge occurs along the border of lateral and ventral surfaces of the pouch. Lateral surface reticulate. Adults about 0.8 mm long.

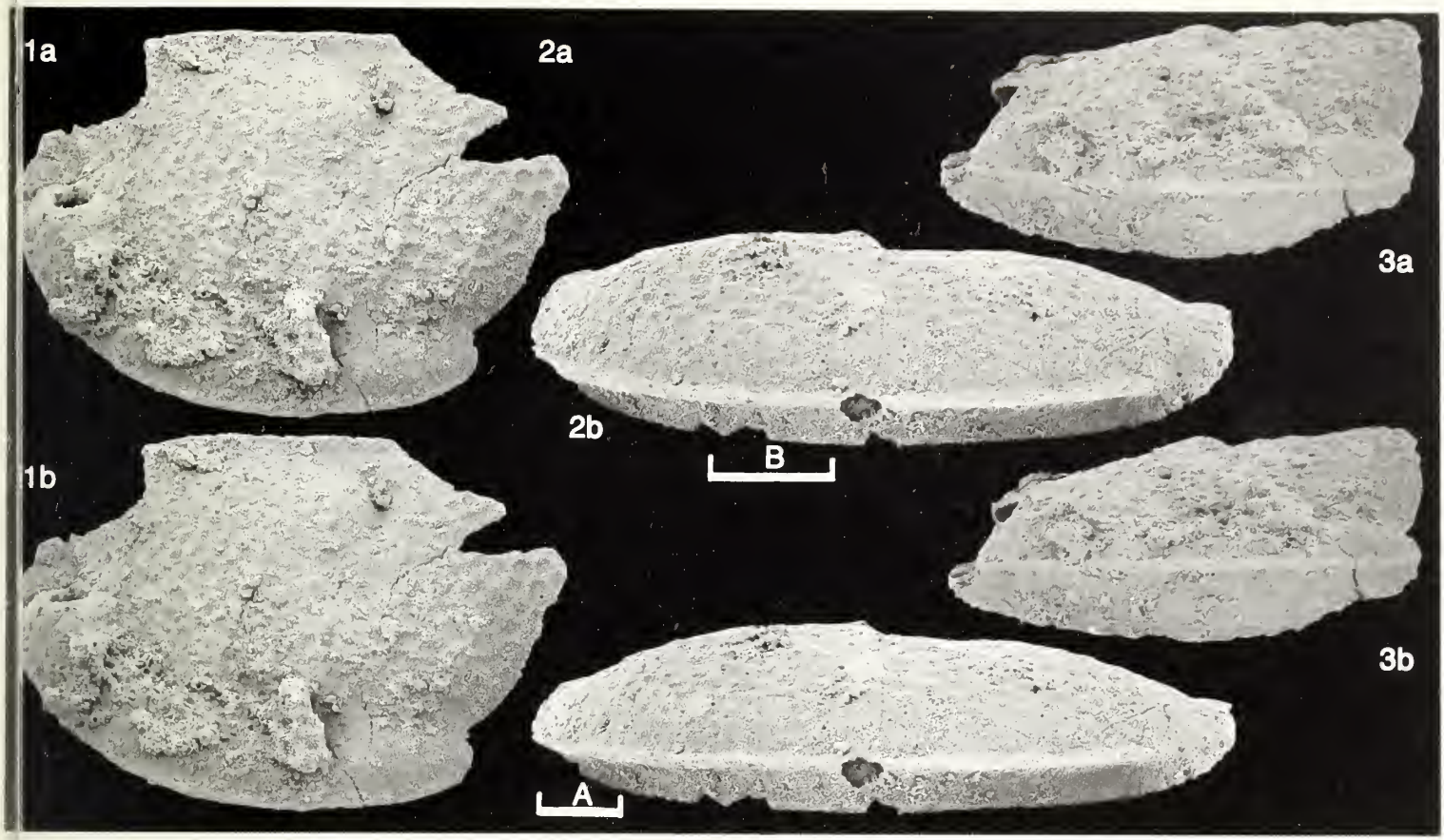
Remarks: *P. commasulcata* is distinguished from congeneric species mainly by its elongate shape and its diagnostic short, comma-shaped sulcus. *Piretia erinacea* Schallreuter, 1964 (lower Upper Viruan Backsteinkalk erratic boulders of Northern Germany) differs further in having a row of short spines instead of a ridge at the border of the lateral and ventral surfaces of the female dolon, its tecnomorphic velum is developed as a spinose ridge or a row of spines and its surface is spinose and granulose (Schallreuter, *Palaeontographica* (A), **144**, pl. 18, fig. 1, pl. 17, figs. 5-7, 1973).

Piretia reticulata Qvale, 1980 (*Norsk Geol. Tidsskr.*, **60**, 94), from the Caradoc Series of the Oslo region, resembles *P. commasulcata* in having reticulation and a velar flange with an abrupt posterior termination but is distinguished by its much better developed sulcus, its centrodorsal spine and by its tecnomorphic velum which consists of a row of spines recalling that of *P. erinacea* (Qvale, *op. cit.*, figs. 2, 3).

Distribution: Known from the type locality and from Öjlemyrflint erratic boulders of the Isle of Gotland, Baltic Sea (boulder no. G30 of Schallreuter collection).

Explanation of Plate 12, 18

Fig. 1, juv. LV, ext. lat. (paratype, **GPIMH 2939**); fig. 2, slightly incomplete juv. RV, ext. lat. (paratype, **GPIMH 2940**, 689 μm long).
Scale A (100 μm; × 170), fig. 1; scale B (100 μm; × 140), fig. 2.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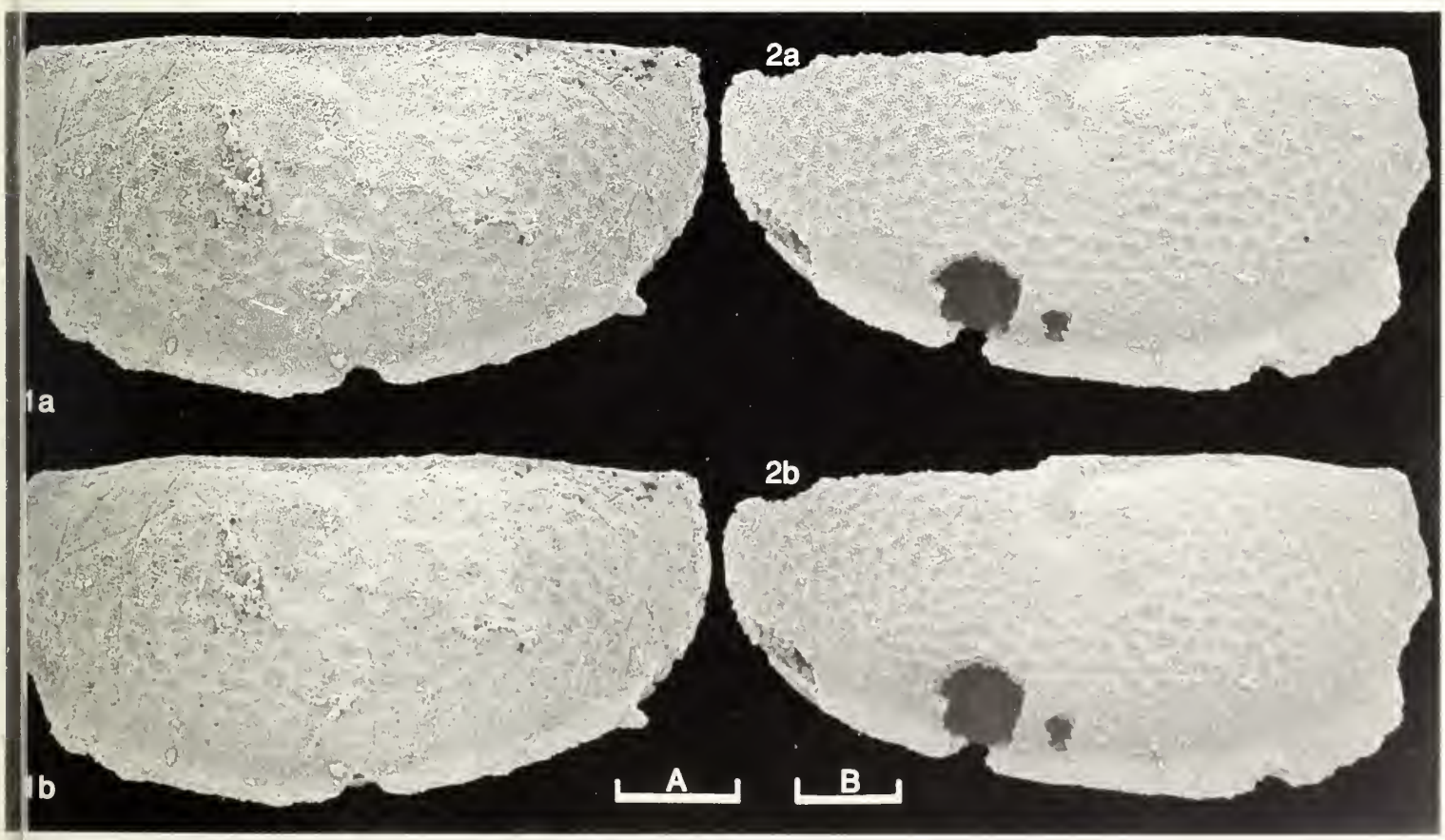
2a
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595.337.2 (113.313) (485 : 161.018.57) : 551.35 + 552.55

ON *KROEMMELBEINIA VALENSIS* SCHALLREUTER sp. nov.

by Roger E. L. Schallreuter
(University of Hamburg, German Federal Republic)

Kroemmelbeinia valensis sp. nov.

Holotype: Geologisch-Paläontologisches Institut und Museum, University of Hamburg (**GPIMH**) no. **2943**; a carapace.
[Paratypes: nos. **2944–2947**].

Type locality: Upper Harjuan (upper Ordovician) Öjlemyrflint erratic boulder no. G287 from the beach at Vale, NE Gotland (Baltic Sea), Sweden; lat. 57°48′N, long. 18°26′E.

Derivation of name: After the type locality, Vale, Gotland.

Figured specimens: **GPIMH** nos. **2944** (paratype, LV: Pl. **12**, 20, fig. 1), **2945** (paratype, RV: Pl. **12**, 20, fig. 2), **2943** (holotype, car.: Pl. **12**, 22, fig. 1) and **2946** (paratype, LV: Pl. **12**, 22, fig. 2). All specimens are from the type locality; boulder collected by the author in 1976.

Explanation of Plate 12, 20

Fig. 1, LV, ext. lat. (paratype, **GPIMH 2944**, 1505 μm long); fig. 2, RV, ext. lat. (paratype, **GPIMH 2945**, 1805 μm long).
Scale A (250 μm; ×67), fig. 1; scale B (250 μm; ×55), fig. 2.

Diagnosis: Species of *Kroemmelbeinia* with the 'anteroventral corner' situated near the longitudinal middle line and only weakly pointed. Posteroventral corner pointed but not spinose. Adults up to 2.00 mm long.

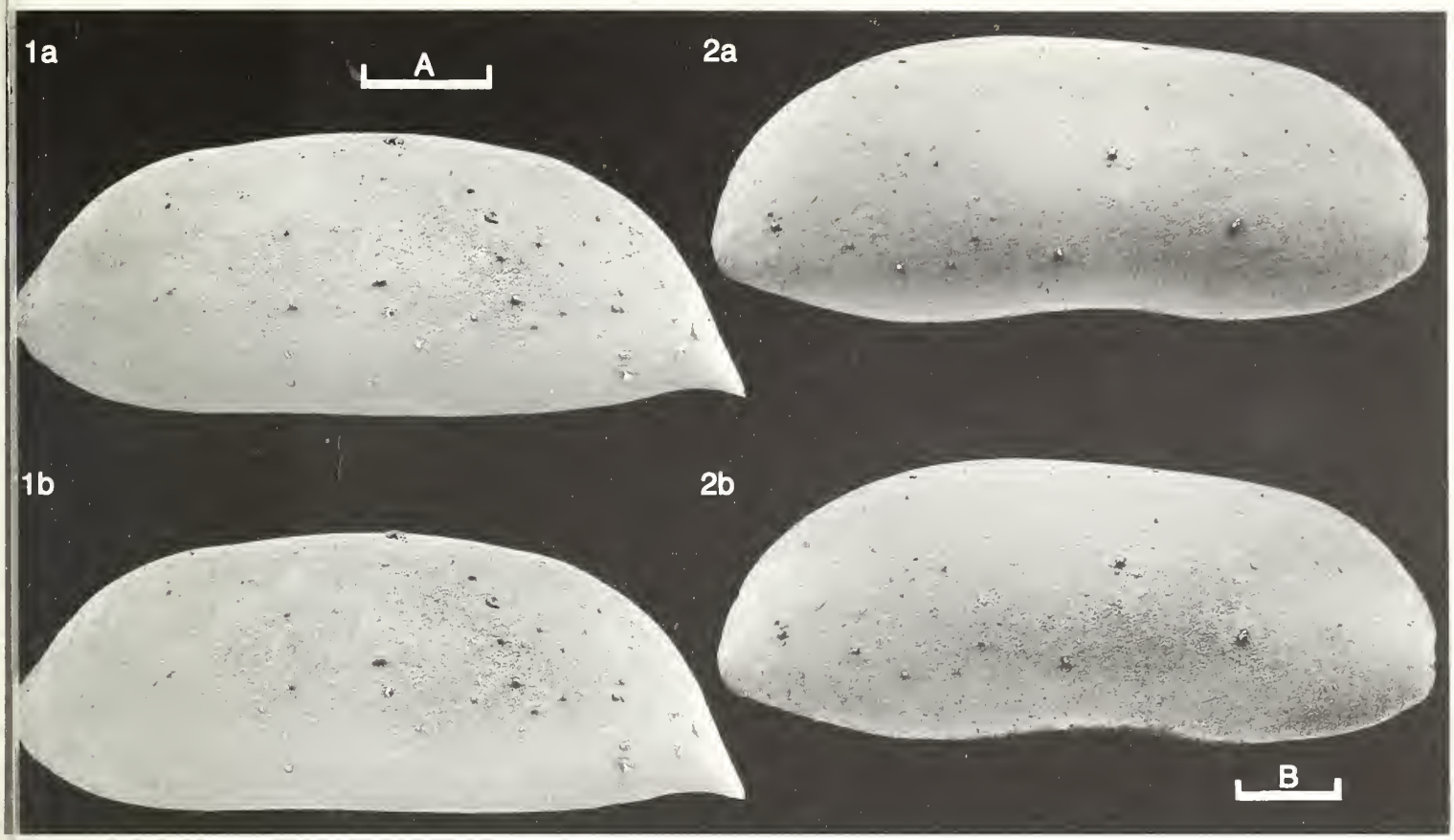
Remarks: The middle Ordovician type-species, *Kroemmelbeinia ala* Schallreuter (*Geologie* **18**, 211, 1969) (= *Beecherellita ordovica* Neckaja, 1973; Schallreuter, *Geol. För Stockh. Förh.* **97**, 387, 1975), has the same shape (length : height ratio) but is much smaller (adults 0.82 mm long). Moreover, the anteroventral corner in *K. ala* is more pointed and lies more ventrally than in *K. valensis*, and its posteroventral corner forms a short spine whereas in *K. valensis* it is only pointed.

K. valensis clearly displays two stop-pegs in the larger valve (Pl. **12**, 22, fig. 2). In the last decade this feature has proved to be very important in the higher taxonomy of Ordovician podocopes. It is characteristic for Ordovician metacopes (e.g., see *Stereo-Atlas Ostracod Shells* **5**, 56, fig. 1; **7**, 76, fig. 2; **7**, 80, figs. 1–2; Schallreuter, *Proc. VII Internat. Symp. Ostracodes Belgrade* 1979, pl. 1, figs. 2, 6, 8, 9, pl. 2, fig. 5), and is taxonomically more important than the general outline and other features. Thus, it has helped unmask excellent examples of homeomorphy in ostracodes; for example, *Kroemmelbeinia spina* Schallreuter, 1969 has a distinct inner lamella but lacks stop-pegs and was therefore later placed in *Spinobairdia*. A second example involves *'Platyrhomboides' minimus* (with broad inner lamella) and 'P.' *breviclaustrum* (with two stop-pegs) (Schallreuter, 1979, *op. cit.*, pl. 1, figs. 7, 8 and pl. 2, figs. 3, 4).

Distribution: Known only from the type locality; upper Ordovician.

Explanation of Plate 12, 22

Fig. 1, car., ext. rt. lat. (holotype, **GPIMH 2943**, 1765 μm long); fig. 2, LV, int. lat., slightly obl., showing stop-pegs (paratype, **GPIMH 2946**, 2000 m long).
Scale A (250 μm; ×59), fig. 1; scale B (250 μm; ×51), fig. 2.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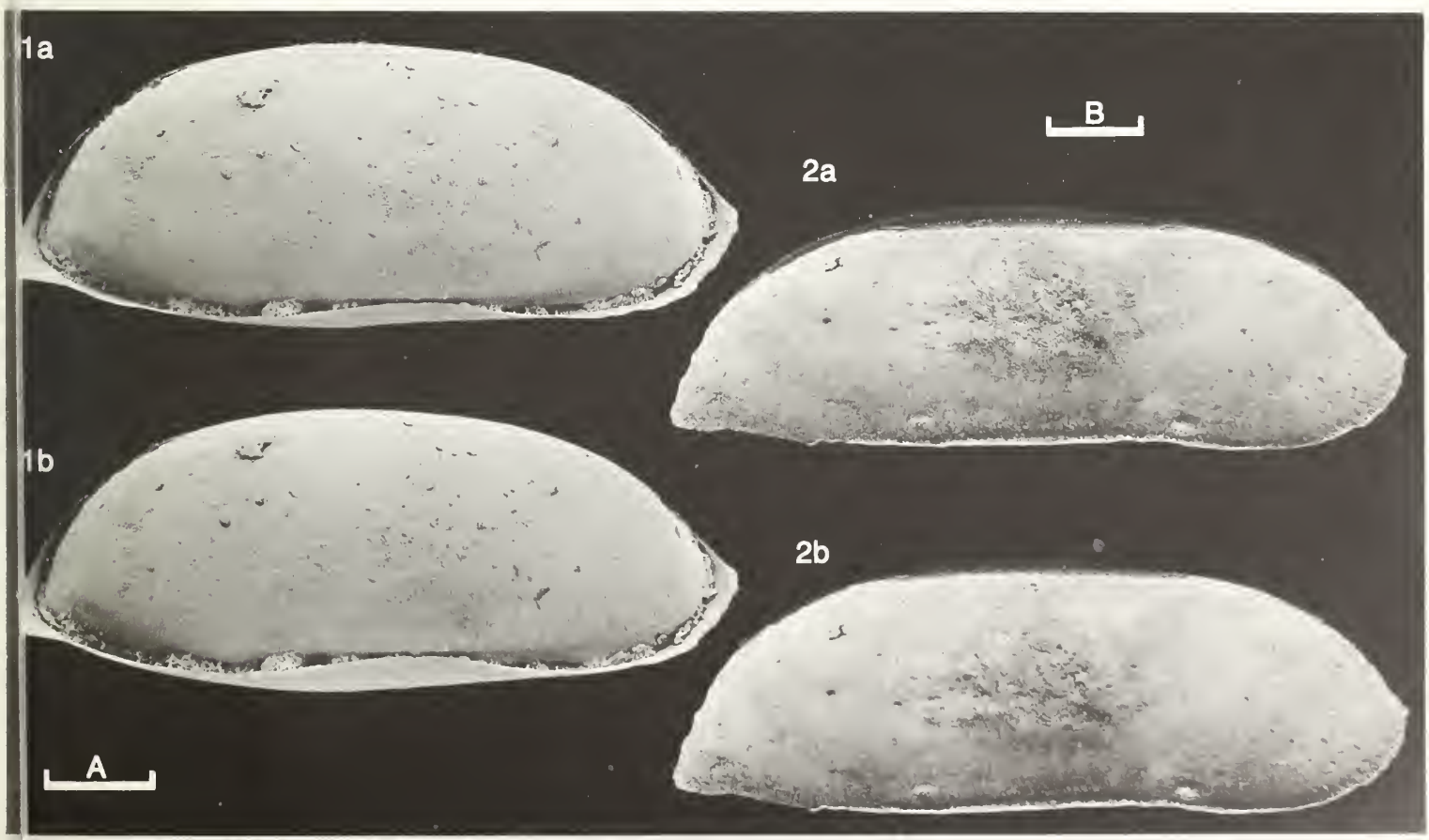
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ON *GLYPTOCYTHERE RAASAYENSIS* STEVENS sp. nov.

by Graham W. Stevens
(University of Hull, England)

Glyptocythere raasayensis sp. nov.

Holotype: University of Hull no. **HU.212.J.1**, a ♀ carapace.
[Paratypes: nos. **HU.212.J.2-6**].

Type locality: Stream section at Brae (Nat. Grid. Ref.: NG 515418), Isle of Raasay, Scotland. Garantiana Clay, *garantiana* Zone, Bajocian, Jurassic.

Derivation of name: From the type locality, Isle of Raasay.

Figured specimens: University of Hull, nos. **HU.212.J.1** (holotype, ♀ car.: Pl. **12**, 24, fig. 1, Pl. **12**, 26, fig. 1), **HU.212.J.2** (♂ RV: Pl. **12**, 24, fig. 2, Pl. **12**, 28, fig. 1; specimen broken subsequent to photography), **HU.212.J.3** (♂ car.: Pl. **12**, 26, fig. 2), **HU.212.J.4** (♀ LV: Pl. **12**, 28, fig. 2, Pl. **12**, 30, fig. 2), **HU.212.J.5** (♂ LV: Pl. **12**, 30, fig. 1). All the specimens are from the type locality and horizon.

Diagnosis: A species of *Glyptocythere* in which the carapace shows well developed reticulation formed by fine anastomosing ribs over most of the lateral surface. The postero-dorsal, dorsal and antero-dorsal marginal areas are smooth and there are prominent pore conuli in the postero-dorsal area. Five prominent longitudinal ribs are developed ventrally. Sexual dimorphism distinct, the presumed females being proportionally higher and wider than the males. Hinge and muscle scar pattern typical of the genus.

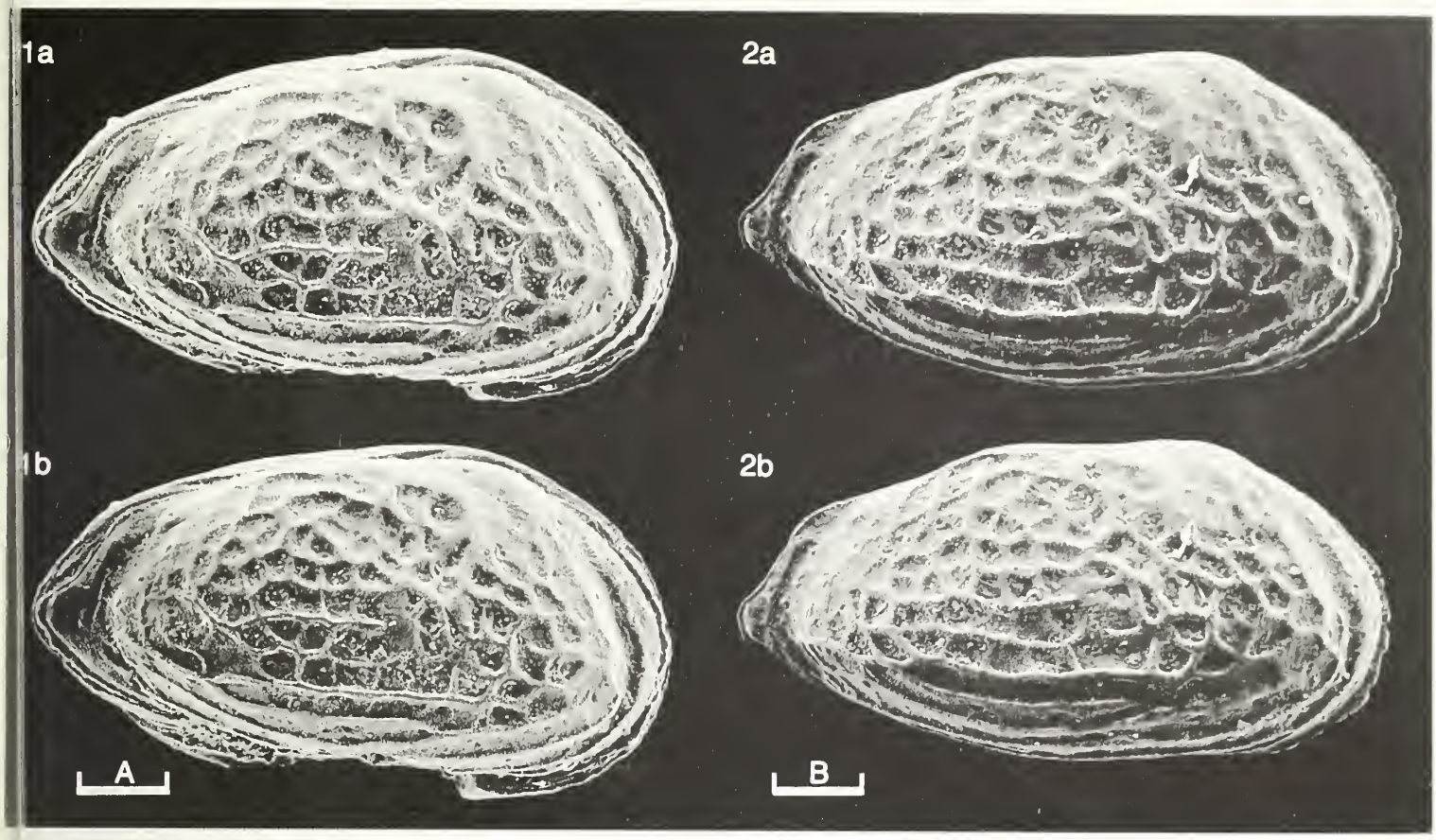
Explanation of Plate 12, 24

Fig. 1, ♀ car., rt.lat. (holotype, **HU.212.J.1**, 750μm long); fig. 2, ♂ RV, ext.lat. (**HU.212.J.2**, 700μm long).
Scale A (100μm; ×120), fig. 1; scale B (100μm; ×130), fig. 2.

Remarks: Whereas the early Bajocian and Bathonian ostracod faunas of Britain are well known, there is a dearth of information on higher Bajocian faunas and so a lack of material with which the present species can be compared. However, on the continent the upper Bajocian *Glyptocythere* species are well known; the type-species, *G.tuberodentina* Brand & Malz, 1962 (*Senckenberg.leth.*, **43**, 433-435), comes from the Obere Parkinsonienschichten of NW Germany which lies above the *garantiana* Zone. There are clearly similarities between the present species and the type-species in the general pattern of ornamentation but in *G.raasayensis* the reticulation lacks the accentuation of the vertical element seen in *G.tuberodentina*. General shape is similar in the females, but the male *G.raasayensis* has a narrower caudal projection. The Scottish species also has five longitudinal ventral ribs compared with three or four in the type-species. *G.regulariformis* Brand & Malz, 1962 from the Garantianenschichten in Germany, of comparable age to the Scottish deposit, is much closer to the present species in the form of ornamentation but has a much more convex ventral margin. There is nothing else comparable from the *garantiana* Zone. The slightly earlier *G.praecursor* Brand & Malz, 1966 from the Subfurcatenschichten shows similar but coarser ornamentation and a more convex ventral margin. Other species are less close. Among the earlier British species *G.scitula* Bate, 1965 from the *humphresianum* Zone is closer than any of the German species and *G.raasayensis* could well be a later derivative. The latter differs most obviously in the better-defined postero-dorsal angle and the straight or slightly convex dorsal margin.

Explanation of Plate 12, 26

Fig. 1, ♀ car., dors. (holotype, **HU.212.J.1**, 750μm long); fig. 2, ♂ car., dors. (**HU.212.J.3**, 740μm long).
Scale A (100μm; ×130), figs. 1, 2.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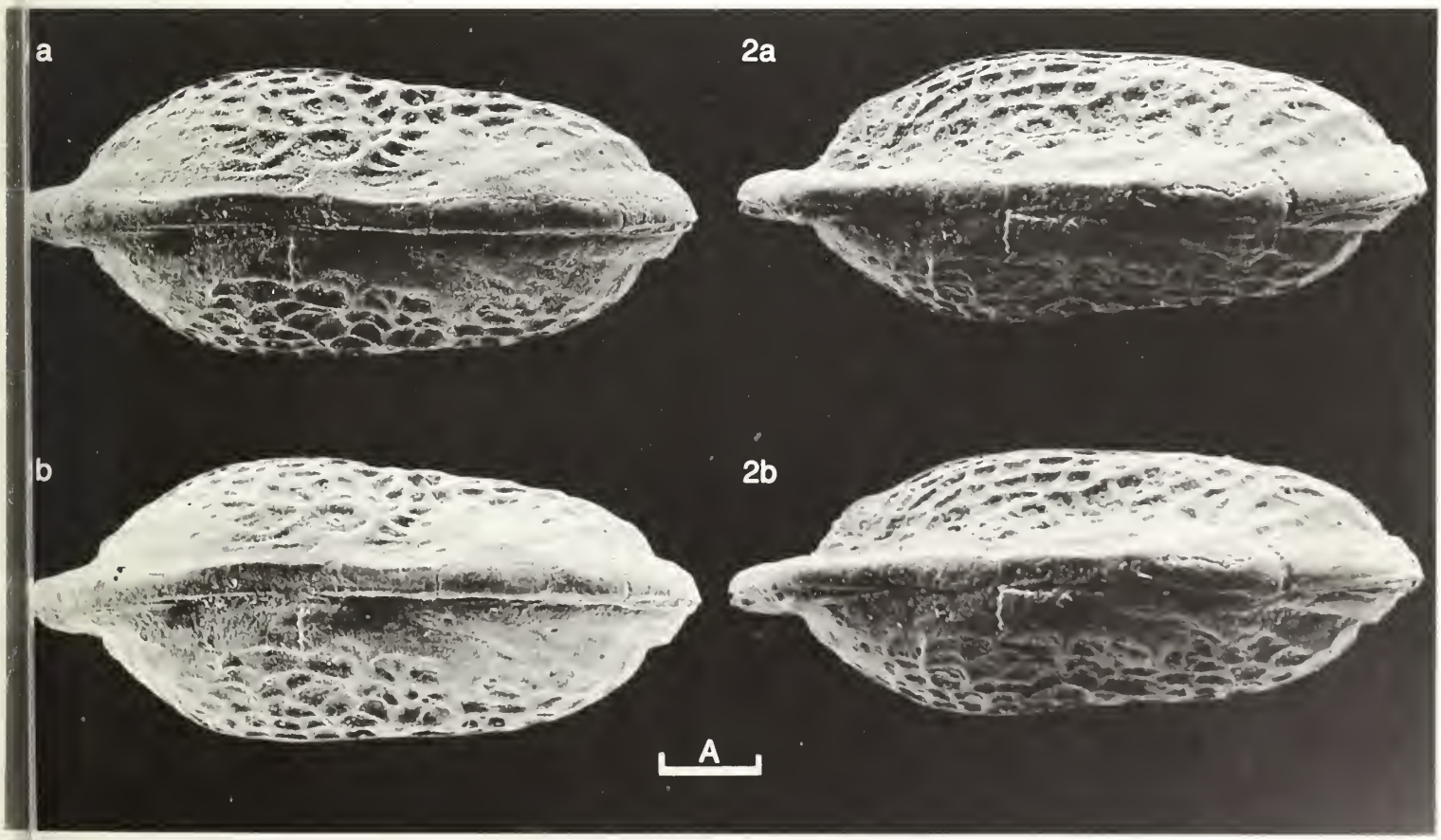
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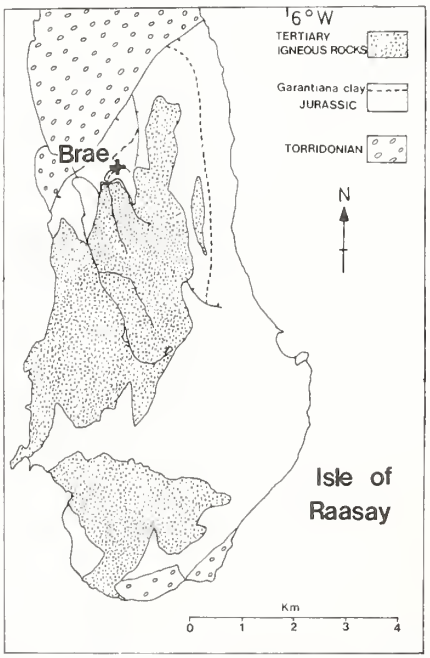
A

Remarks (contd.): The type locality, near Storab's Grave, is regarded by Morton (*Scott.J.Geol.*, **12**, 24, 1976) as the best in the Hebrides. Here the Garantiana Clay is approximately 2 m thick and lies directly above the Bearreraig Sandstone Formation. It consists of poorly bedded, structureless medium-grey clay which is highly fossiliferous and contains the ammonites *Garantiana (G.) filicosta* and *Garantiana (G.) baculata* as well as a large number of small bivalves including prolific *Avicula*. The microfauna is restricted to three foraminiferal species (*Ammobaculites agglutinans*, *Frondicularia oolithica* and *Lenticulina limbata*) and this single ostracod species. The ammonites and all the other fauna suggest normal marine salinities, but the pyritisation of the ammonites, the small size (less than 4 mm) of the bivalves together with their pyrite skin and the restricted nature of the microfauna suggest generally inimical conditions and perhaps somewhat deoxygenated bottom waters. The general aspect of the fauna suggests a shallow shelf sea with a depth of about 20 m.

Distribution: So far known only from the type locality.

Explanation of Plate 12, 28

Fig. 1, ♂ RV, int.lat. (**HU.212.J.2**, 700 μm long); fig. 2, ♀ LV, int.lat. (**HU.212.J.4**, 660 μm long).
Scale A (100 μm; × 140), figs. 1, 2.

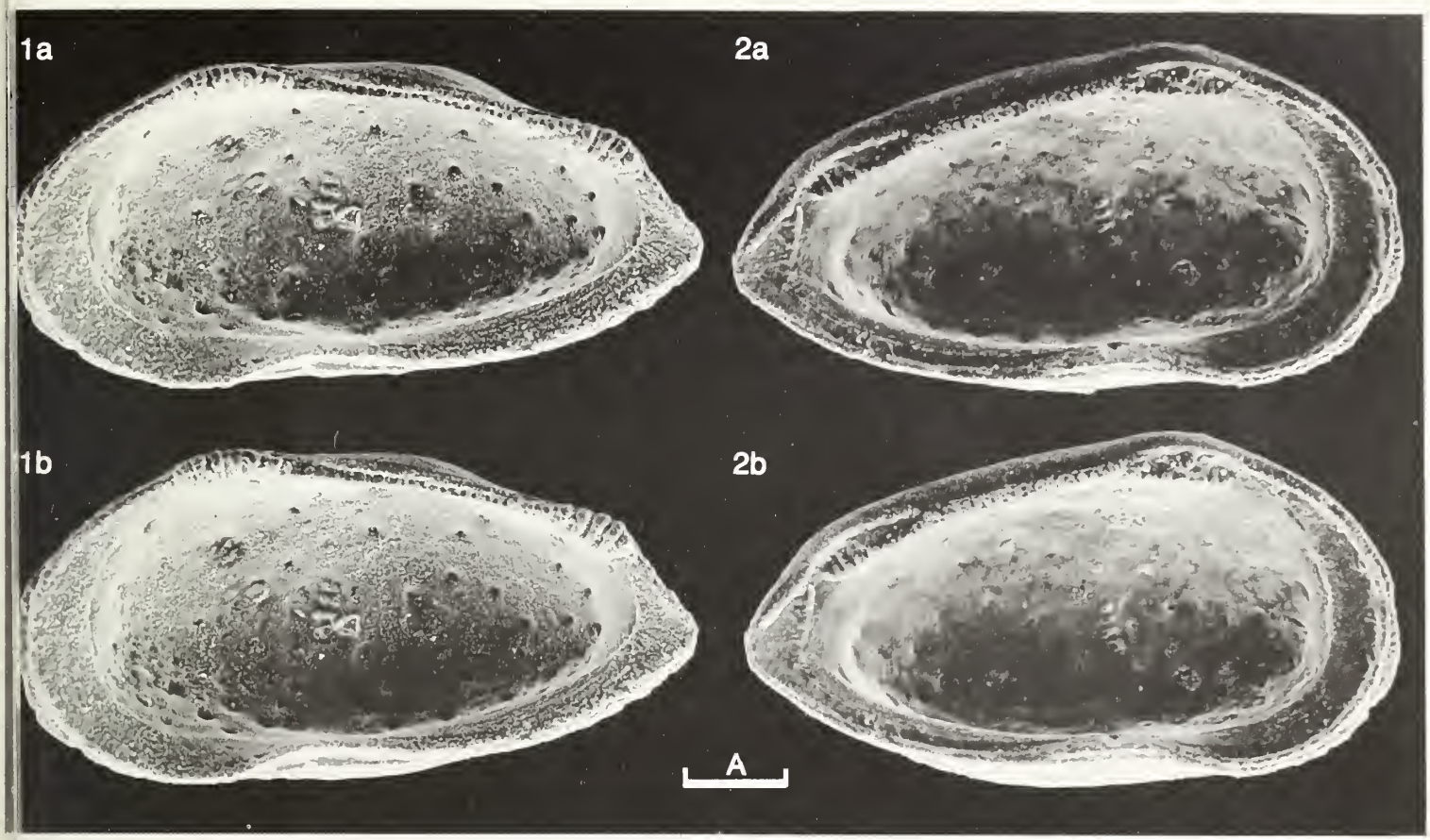


Text-fig. 1. Simplified geological map of central and southern Raasay showing the outcrop of the Garantiana Clay and the type locality at Brae.

Text-fig. 2. Muscle scar pattern of *G. raaysayensis*.

Explanation of Plate 12, 30

Fig. 1, ♂ LV, ext.lat. (**HU.212.J.5**, 575 μm long); fig. 2, ♀ LV, ext.lat. (**HU.212.J.4**, 660 μm long).
Scale A (100 μm; × 160), fig. 1; scale B (100 μm; × 150), fig. 2.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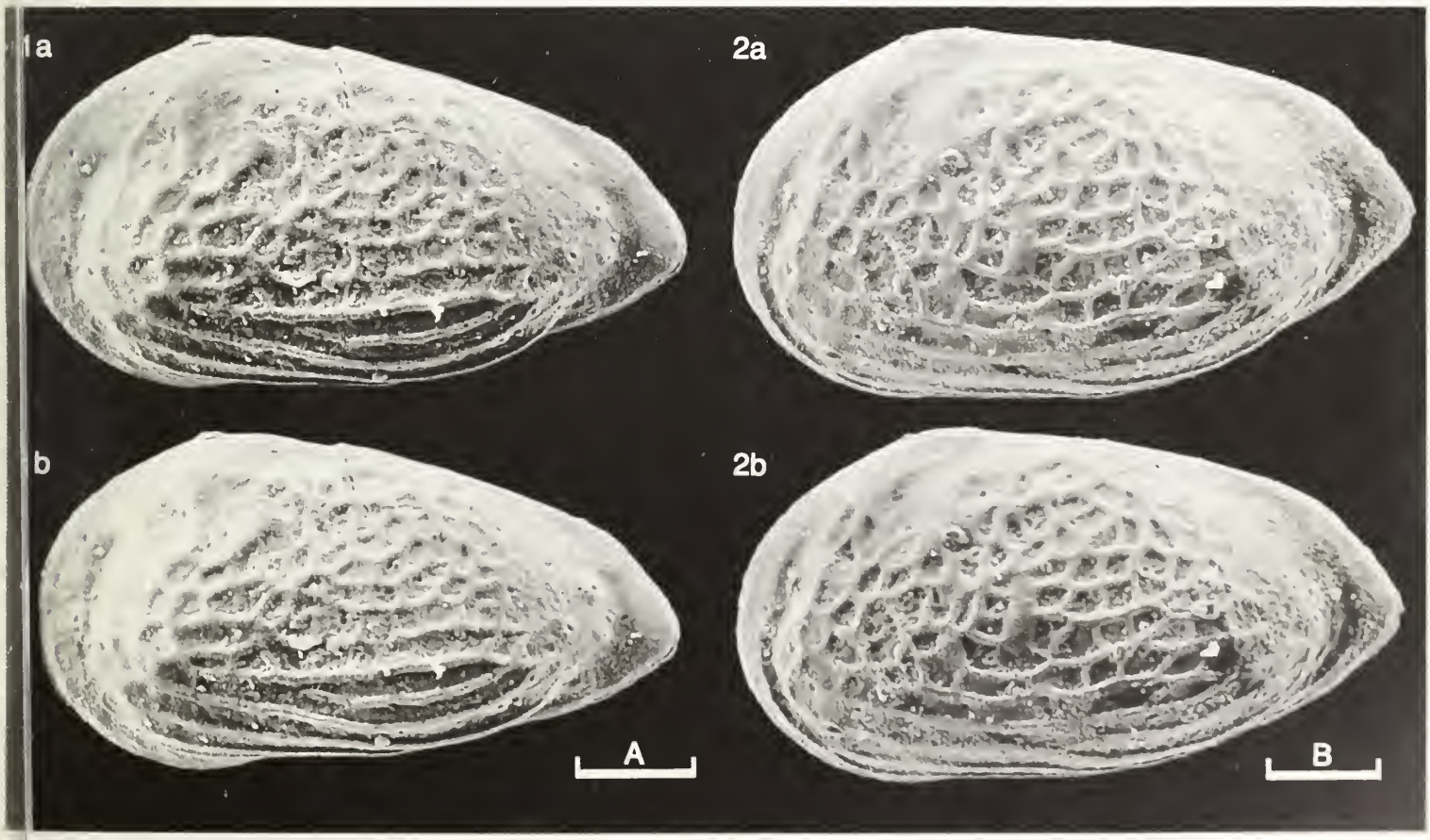
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595.337.14 (119.3) (510 : 161.114.40) : 552.52

ON *LIMNOCYTHERE SHIXIAENSIS* (WANG)

by Wang Qiang
(Tianjin Institute of Geology and Mineral Resources, China)

Limnocythere shixiaensis (Wang, 1980)

1980 *Leucocythere shixiaensis* sp.nov. Q.Wang, *Bull.Chinese Acad.geol.Sci.*, ser. 6, **1** (2), 127-134, pl. 1, figs. 1-5, text-fig. 2.

Neotype: Tianjin Institute of Geology and Mineral Resources no. **os.84.7-1**, a ♀ carapace.

Type locality: Basal portion of the Xiashagou section, Yangyuan County, Hebei Province, China. Nihewan Formation, Lower Pleistocene.

Figured specimens: Tianjin Inst. Geol. & Min. Res. nos. **os.84.7-1** (neotype, ♀ car.: Pl. **12**, 32, figs. 1-4), **os.84.7-2** (plesiotype, ♀ car.: Pl. **12**, 34, figs. 1-4), **os.84.7-3** (plesiotype, ♀ car.: Pl. **12**, 36, figs. 1-4), **os.84.7-4** (plesiotype, ♀ juv. car.: Pl. **12**, 38, figs. 1-4), **os.84.7-5** (plesiotype, ♀ RV: Pl. **12**, 32, fig. 5; Pl. **12**, 34, fig. 5; Text-figs. 1a-d), **os.84.7-6** (plesiotype, ♀ LV: Pl. **12**, 36, fig. 5; Pl. **12**, 38, fig. 5; Text-fig. 2). All the specimens are from the type locality and horizon.

Diagnosis: Carapace reniform in lateral view with broadly rounded anterior margin; posterior margin more squarish. Asymmetrical ridges on both valves; a ridge follows the valve margin in the posterior area of the right valve and a wavy ridge occurs in the ventral area of the left valve. Two nodes occur dorsally, one on either side of a dorso-median sulcus, with the anterior one developing a faint ridge parallel to the antero-dorsal margin.

Explanation of Plate 12, 32

Figs. 1-4, ♀ car. (neotype, **os.84.7-1**, 860 μm long): fig. 1, rt. lat.; fig. 2, dors.; fig. 3, lt. lat.; fig. 4, vent.; fig. 5, ♀ RV, int. lat. (**os.84.7-5**, 820 μm long). Scale A (400 μm; × 60), figs. 1-5.

Remarks: Since all the original type specimens of this species have been destroyed, the specimens illustrated herein are designated as a neotype and plesiotypes. Originally this species was thought to belong to the genus *Leucocythere* (Wang 1980, *op.cit.*), but since it appears to be impossible to differentiate between *Leucocythere* and *Limnocythere* on carapace characters alone, it is now decided to place it in the latter genus. It is considered that the unusual morphological features of this species (asymmetrical valves and ridges) do not simply result from a salinity change as was originally suggested (Wang 1980, *op.cit.*). It should be mentioned that *Limnocythere inderica* Sharapova, as described by Kazmina (*Trudȳ Inst.Geol.Geofiz.sib.Otd.*, **264a**, 1-108, 1975), has a right valve with a peripheral ridge and a left valve with a ventral ridge, or vice versa, but unfortunately she did not illustrate the shape of the carapace. In the Danangou section in Yuxian County, Hebei Province, the author found the carapace of a species with a posterior peripheral ridge in both valves (therefore symmetrical ones), which was determined as *Leucocythere burangensis* Huang (Huang Baoren *et. al.*, 1982; *in*: *Series of the Scientific Expedition to the Qinghai-Xizang Plateau – Palaeontology of Xizang* – Book 4, 326-348); again the carapace was not illustrated in that book.

Distribution: Mr. Zhao Lianbi collected 125 carapaces and other single valves from the Nihewan Formation in the Nihewan-Shixia village section in 1964; the exact location remains unknown. The author collected a few similar specimens from a yellow-green silt-clay and a green-yellow silt at the type locality (Xiashagou section) in 1979. The Xiashagou section is located between Nihewan and Shixia and yielded the famous Nihewan vertebrate fauna of Middle-Upper Villafranchian age (P. T. de Chardin *et al.*, *Annls Paléont.*, **19**, 8, fig. 2, 1930).

Explanation of Plate 12, 34

Figs. 1-4, ♀ car. (**os.84.7-2**, 820 μm long): fig. 1, rt. lat.; fig. 2, dors.; fig. 3, lt. lat.; fig. 4, vent.; fig. 5, ♀ RV dors. (**os.84.7-5**, 820 μm long). Scale A (400 μm; × 60), figs. 1-5.

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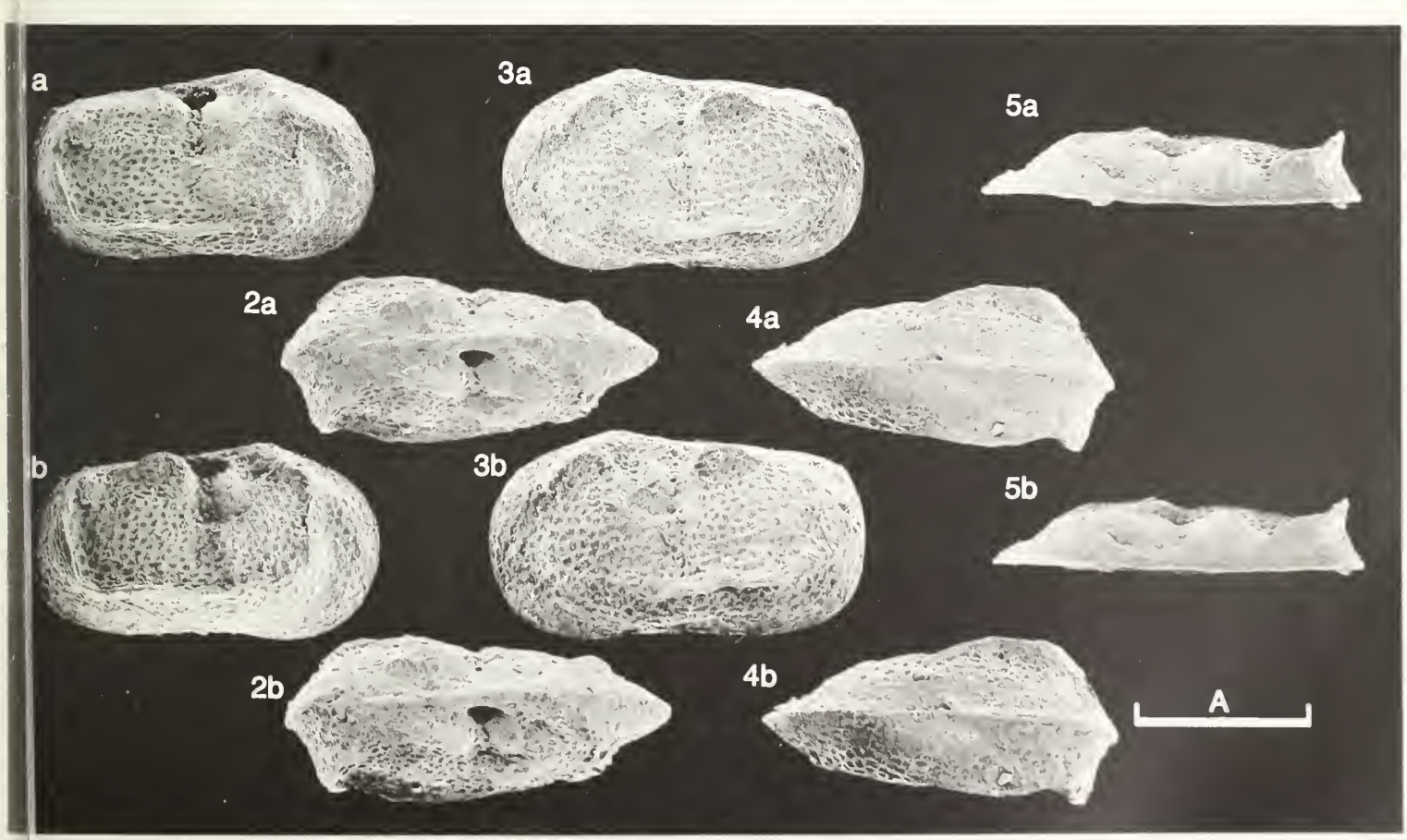
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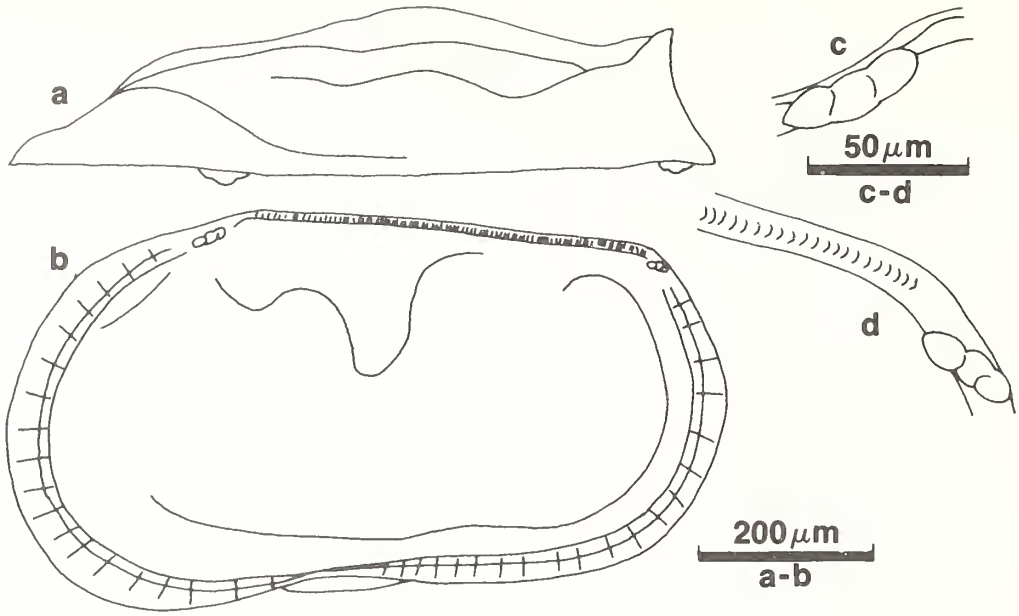
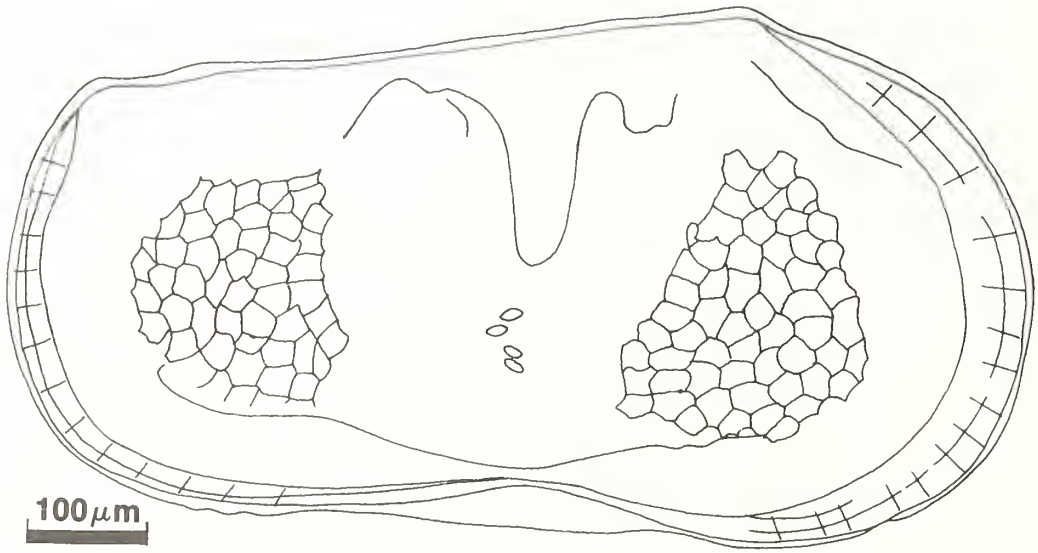


Text-fig. 1. ♀ RV (**os.84.7-5**) of *L.shixiaensis*: a, dors.; b, int. lat.; c-d, details of anterior and posterior hinge teeth.

Explanation of Plate 12, 36

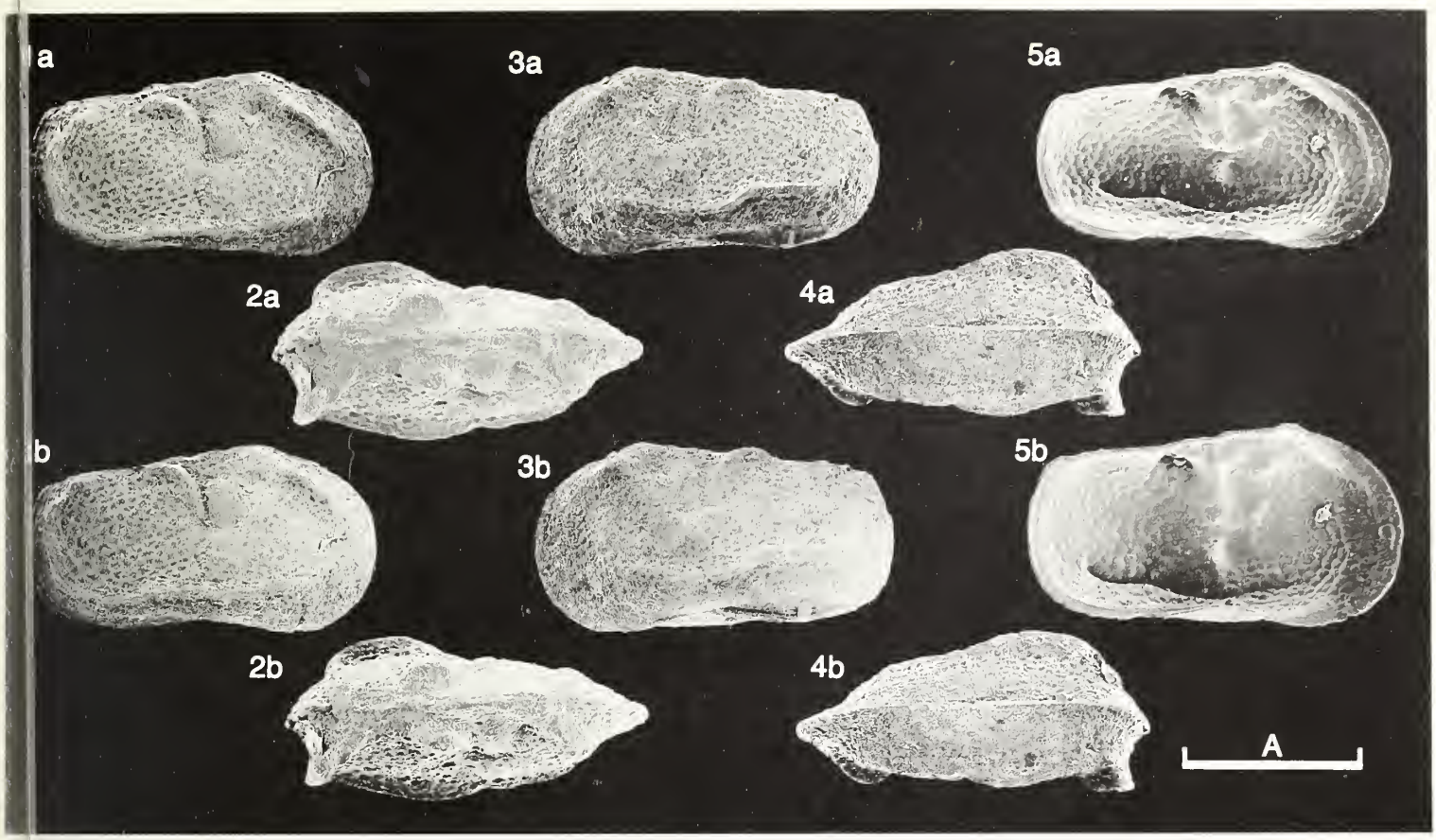
Figs. 1-4, ♀ car. (**os.84.7-3**, 810 μm long): fig. 1, rt. lat.; fig. 2, dors.; fig. 3, lt. lat.; fig. 4, vent.; fig. 5, ♀ LV int. lat. (**os.84.7-6**, 820 μm long). Scale A (400 μm; × 60), figs. 1-5.



Text-fig. 2. ♀ LV (**os.84.7-6**) of *L.shixiaensis*: int. lat.

Explanation of Plate 12, 38

Figs. 1-4, ♀ juv. car. (**os.84.7-4**, 740 μm long): fig. 1, rt. lat.; fig. 2, dors.; fig. 3, lt. lat.; fig. 4, vent.; fig. 5, ♀ LV dors. (**os.84.7-6**, 820 μm long). Scale A (400 μm; × 60), figs. 1-5.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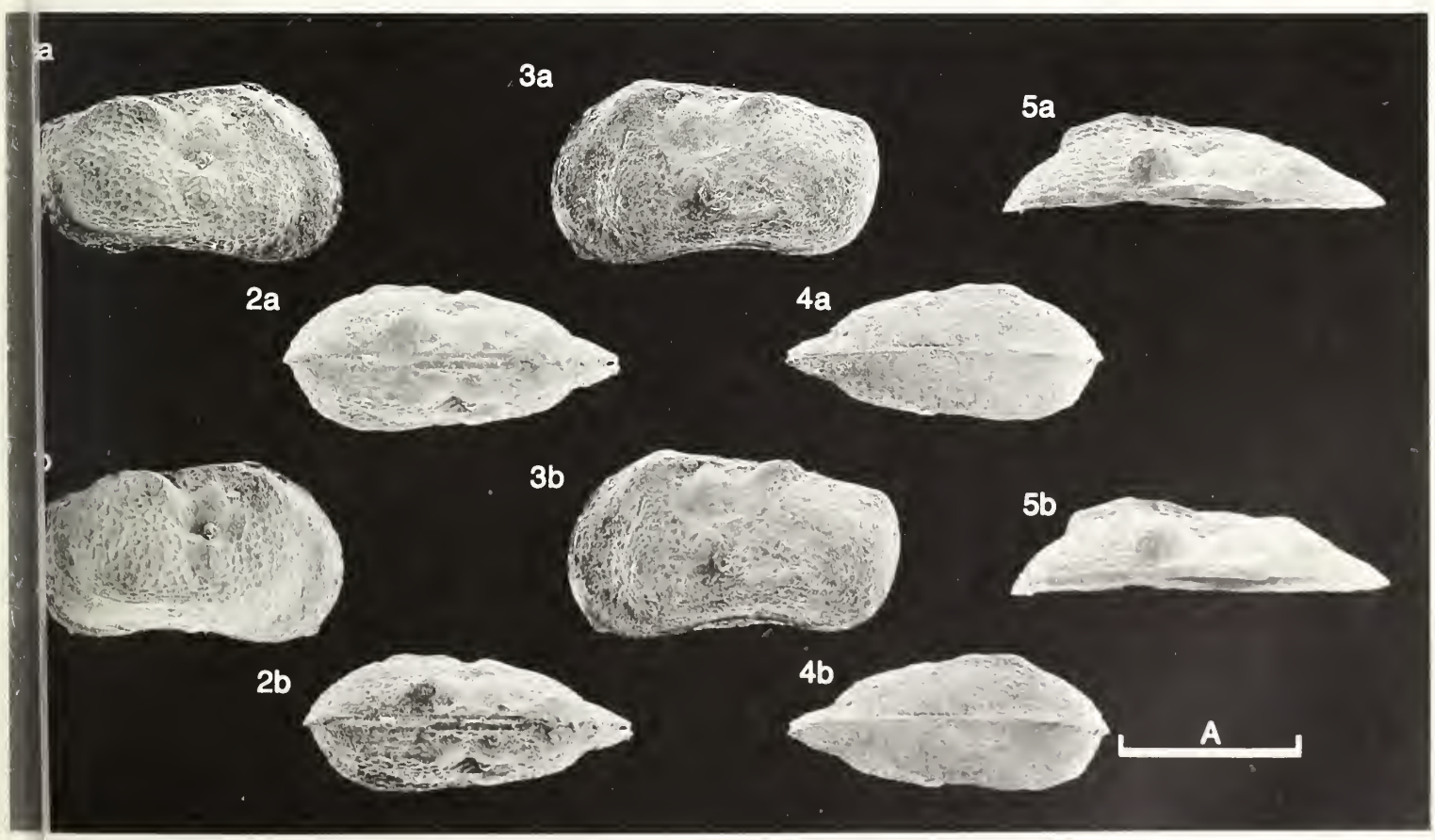
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4b
A

595.337.14 (119.9) (261.2 : 162.007.53 + 560) : 551.351

ON *HILTERMANNICYTHERE EMACIATA* (BRADY)

by John Athersuch & David J. Horne
(B.P. Research Centre, Sunbury-on-Thames & City of London Polytechnic)

Hiltermannicythere emaciata (Brady, 1867)

1867 *Cythere emaciata* sp. nov. G. S. Brady, *Rept.Brit.Assoc.Adv.Sci.*, (for 1866), 210.
1868 *Cythere emaciata* Brady; G. S. Brady, *Trans.Linn.Soc.Lond.*, **26**, 414-415, pl. 31, figs. 31-37.
1874 *Cythere emaciata* Brady; G. S. Brady, H. W. Crosskey & D. Robertson, *Palaeontogr.Soc.* [*Monogr.*] **28**, 161, pl. 9, figs. 14-17.
1940 *Cythereis emaciata* (Brady); O. Elofson, *J.mar.Biol.*, **24**, 498-499, figs. 6-8.

Type specimens: Not present in the Brady collection at the Hancock Museum, Newcastle or in the British Museum (Natural History) and therefore presumed lost.

Type locality: In his original description Brady (*op.cit.*) gave the occurrence of this species as "Hebrides (locality doubtful), and many other places in Great Britain and Ireland".

Figured specimens: Brit. Mus. (Nat. Hist.) nos. **1984.184** (♀ car.; LV: Pl. **12**, 40, fig. 1; Pl. **12**, 42, fig. 3; RV: Pl. **12**, 40, fig. 2; Pl. **12**, 42, fig. 2; appendages: Text-figs. 1a-c, 2a-c), **1984.185** (♂ car.; LV: Pl. **12**, 40, fig. 3; RV: Pl. **12**, 42, figs. 1, 4; copulatory appendage: Text-fig. 2d). Both specimens are from a sample collected by N. Ainsworth in Dublin Bay, Eire (approx. lat. 53° 18′N, long. 06° 05′W), 1 km off Sandy Cove Harbour, depth 15 m.

Explanation of Plate 12, 40

Figs. 1, 2, ♀ car. (**1984.184**, 900 μm long): fig. 1, LV, ext. lat.; fig. 2, RV, ext. lat.; fig. 3, ♂ RV, ext. lat. (**1984.185**, 830 μm long). Scale A (200 μm; ×65), figs. 1-3.

Diagnosis: Carapace elongate, tapering posteriorly; posterior margin with a pointed extremity at about mid-height. Reticulate ornament consists of relatively large, equal-sized, rounded and polygonal intercostal fossae, a few of which coalesce. Reticulum dominated by anterior concentric costa and three distinct longitudinal costae. Ventral and median costae linked posteriorly by oblique costa. Male carapace asymmetric; right valve compressed postero-ventrally, with ventral costa not developed posteriorly. Distal process of male copulatory appendage lamellar, subtriangular, truncated terminally.

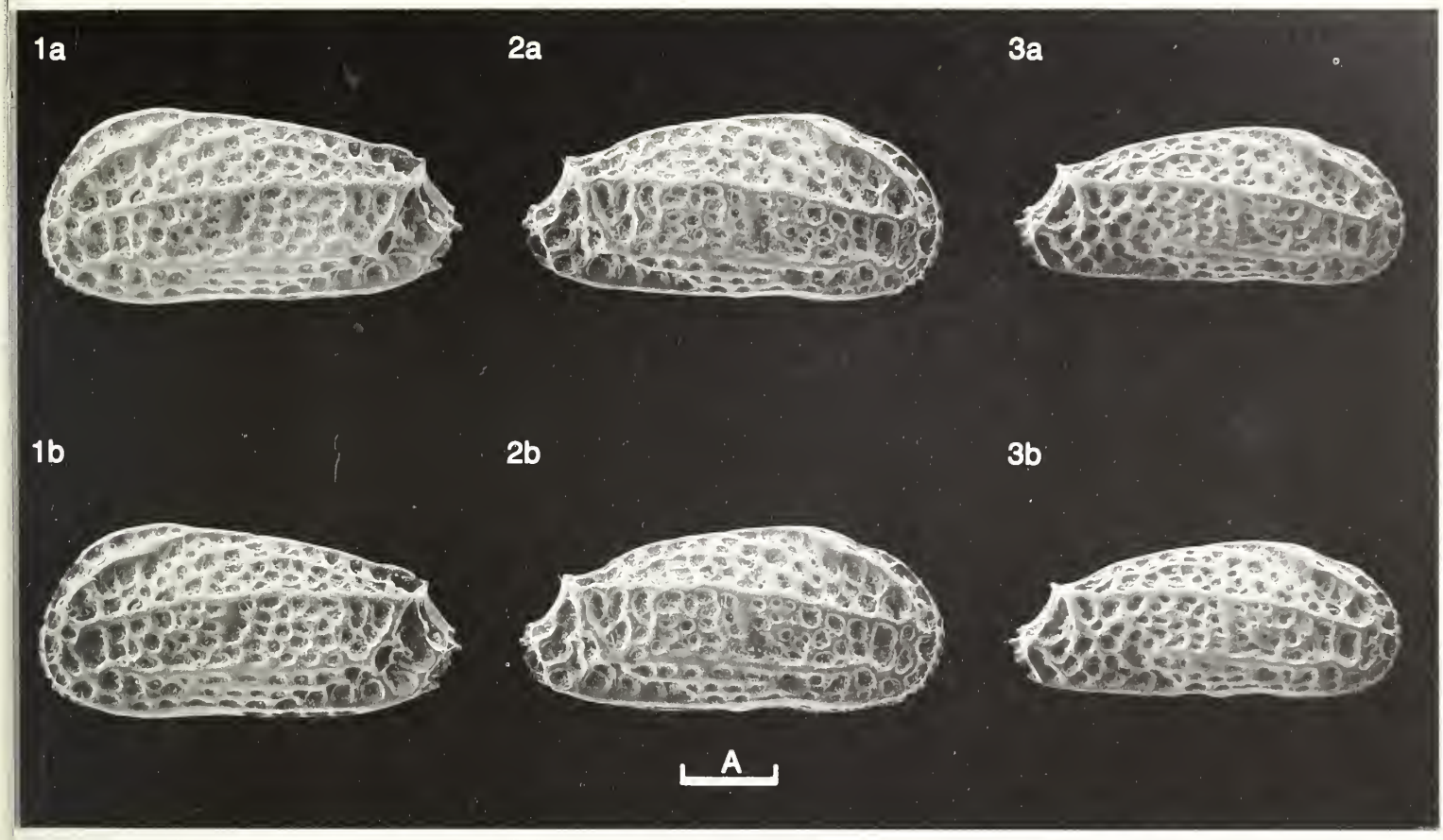
Remarks: *H.rubra* (G. W. Müller, 1894), from the Mediterranean, is very similar to *H.emaciata*. However, *H.rubra* is more quadrate in carapace outline, more truncate posteriorly and the ventral costa is more prominent and not linked posteriorly to the median costa. The sexual dimorphism of the male right valve is strong in *H.emaciata* but only weakly developed in *H.rubra*. The distal process of the male copulatory appendage of *H.rubra* is distally pointed, while that of *H.emaciata* is relatively broader and distally truncate (this comparison is based on Elofson's (*op.cit.*) illustration of the male copulatory appendage of *H.emaciata* as well as on our single, damaged specimen). For further discussion of *H.rubra* see Athersuch & Horne (*Stereo-Atlas of Ostracod Shells* **12**, 45-48, 1985).

Specimens identified as *Falunia (Hiltermannicythere) emaciata* from the Miocene of Turkey by Doruk (1973, unpublished Ph.D thesis, University of Leicester) correspond well to our Recent examples of the species and her material is regarded as conspecific.

Distribution: The distribution of both living and fossil species of *Hiltermannicythere* in NW Europe needs reappraisal. *H.emaciata* appears to live in shallow sublittoral waters around the coasts of England, Wales and Ireland. Recent Mediterranean records should probably be referred to *H.rubra* (G. W. Müller). *H.emaciata* has also been recorded from the Pleistocene of Great Britain (Brady, Crosskey & Robertson, *op. cit.*) and the Miocene of Turkey (Doruk, *op.cit.*).

Explanation of Plate 12, 42

Figs. 1, 4, ♂ (**1984.185**, 830 μm long): fig. 1, LV, ext. lat.; fig. 4, LV, int. lat.; figs. 2, 3, ♀ (**1984.184**, 900 μm long): fig. 2, RV, dors.; fig. 3, LV, dors. Scale A (200 μm; ×65), figs. 1-4.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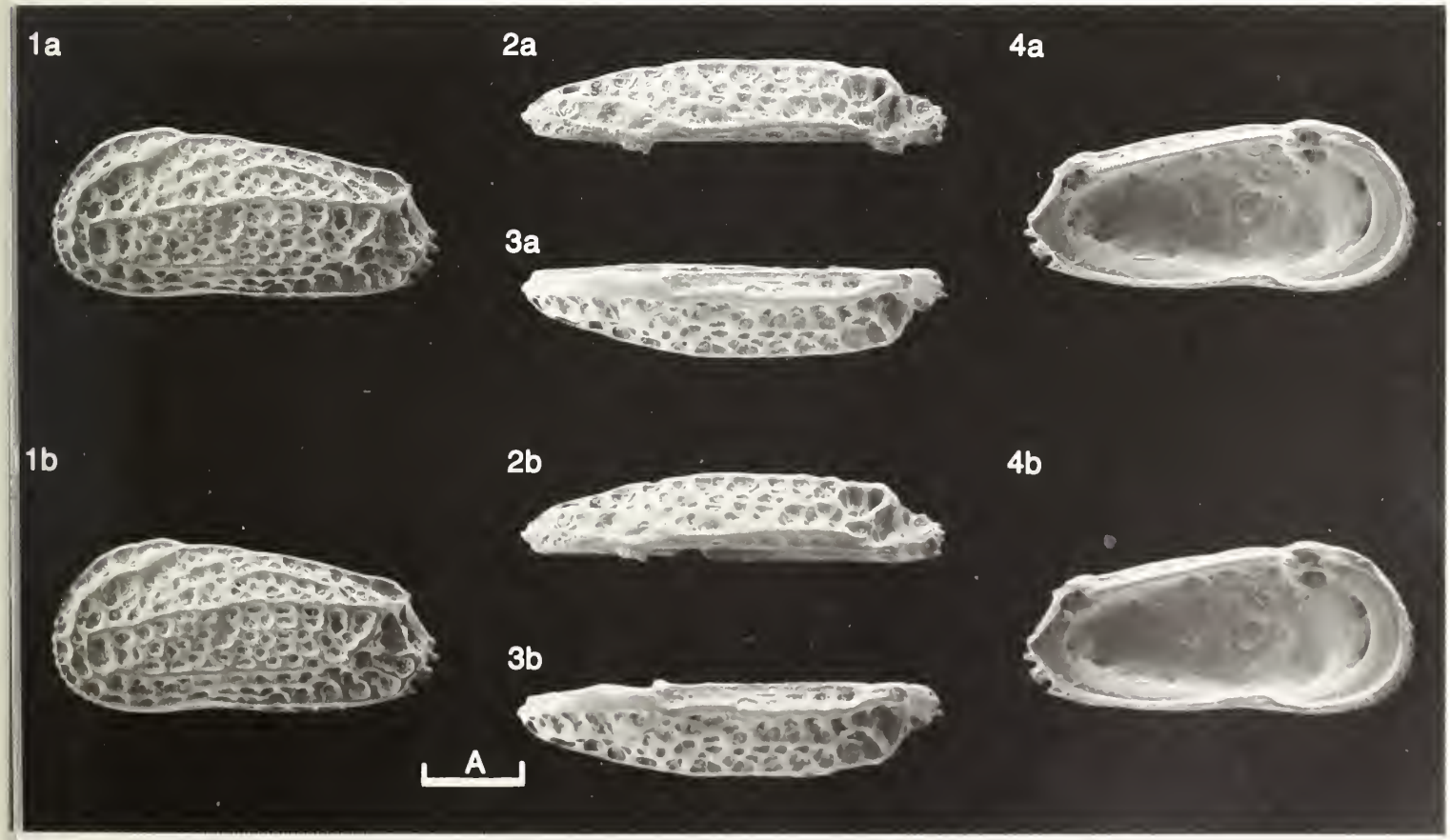
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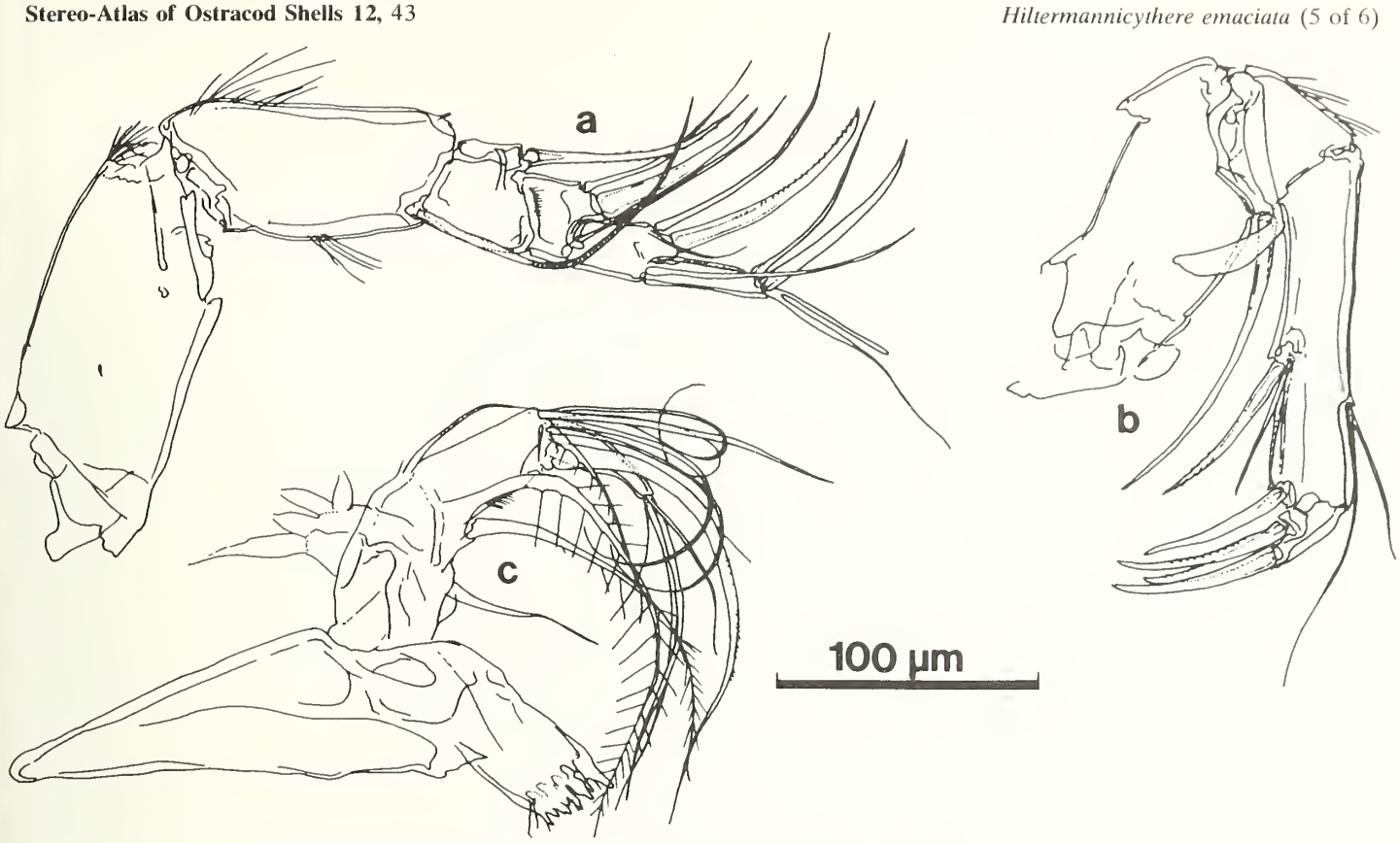
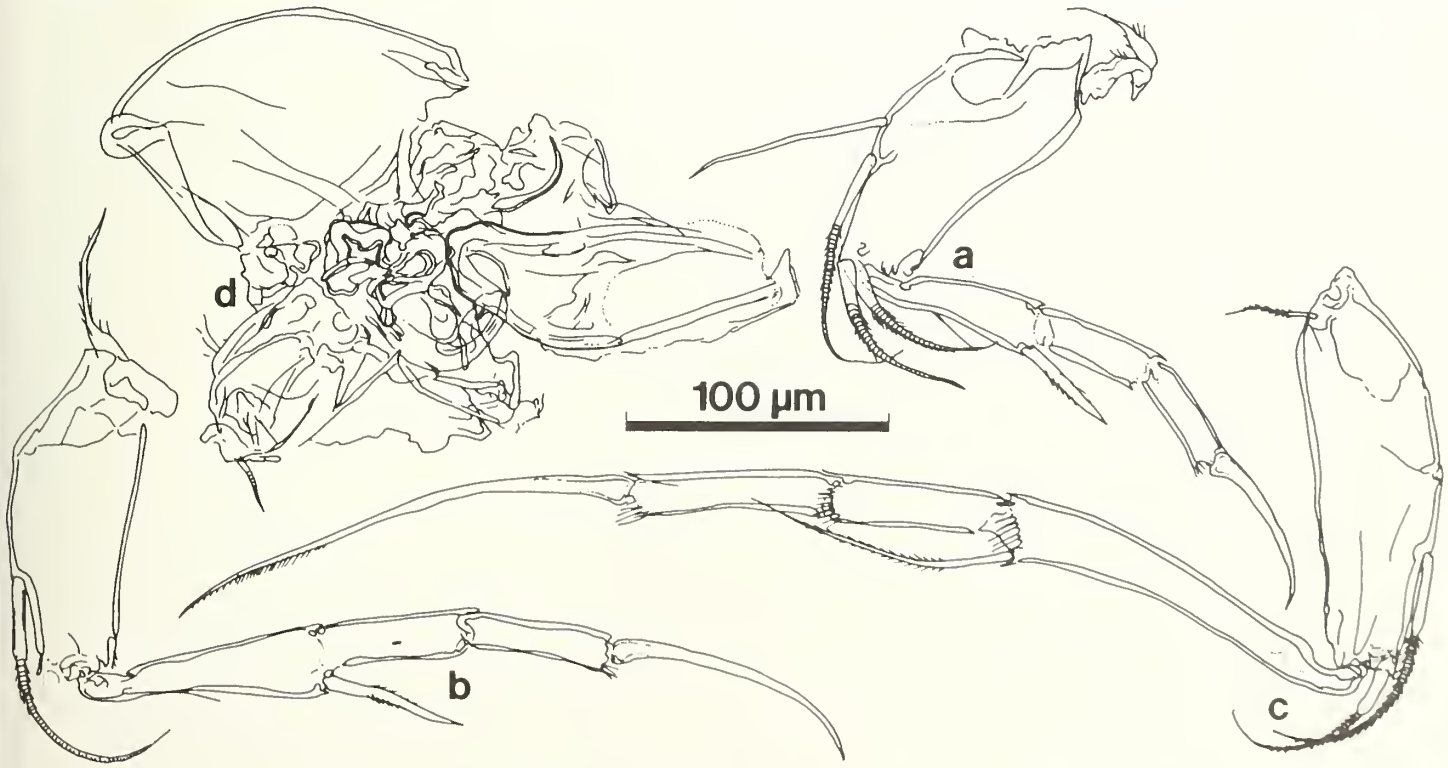


Text-fig. 1. ♀ appendages **(1984.184)** of *H. emaciata*: a, antennula; b, antenna; c, mandible.



Text-fig. 2. ♀ appendages **(1984.184)** of *H. emaciata*: a, first leg; b, second leg; c, third leg; d, ♂ copulatory appendage (damaged; **1984.185**).

595.337.14 (119.9) (262 : 161.034.33 + 161.034.34) : 551.351

ON *HILTERMANNICYTHERE RUBRA* (MÜLLER)

by John Athersuch & David J. Horne
(B.P. Research Centre, Sunbury-on-Thames & City of London Polytechnic)

Hiltermannicythere rubra (Müller, 1894)

1894 *Cythereis rubra* sp. nov. G. W. Müller, *Fauna Flora Golf.Neapel*, **21**, 372, pl. 28, figs. 21, 26, pl. 31, figs. 2, 3.
1971 *Carinocythereis* sp.; P. J. Barbeito-Gonzalez, *Mitt.hamb.zool.Mus.Inst.*, **67**, 281, pl. 14, figs. 1c, 2c, 3c.
1976 *Hiltermannicythere* aff.*H.rubra* (Müller); G. Bonaduce, G. Ciampo & M. Masoli, *Pubbl.Staz.zool.Napoli*, **40** (1), (for 1975), 49, pl. 28, figs. 1-5.
1979 *Hiltermannicythere rubra* (Müller); J. Athersuch, *J.nat.Hist.*, **13**, 140, fig. 2 (13).

Type specimens: Athersuch (*Pubbl.Staz.zool.Napoli* **40** (2), 344-348, 1976) reported specimens in both sections of the G. W. Müller collection: 15 specimens at the Institut für Spezielle Zoologie und Zoologisches Museum der Humboldt Universität zu Berlin, E Germany and 13 specimens at the Zoologischen Institut, Greifswald, E Germany.

Type locality: Bay of Naples, Italy (lat. 40° 40′N, long. 14° 10′E); Recent.

Figured specimens: Brit. Mus. (Nat. Hist.) nos. **1984.186** (♀ car.; LV: Pl. **12**, 46, fig. 1; RV: Pl. **12**, 46, fig. 2), **1984.187** (♂ car.; RV: Pl. **12**, 46, fig. 3; LV: Pl. **12**, 48, figs. 1, 4; copulatory appendage: Text-fig. 1), **1984.188** (♀ car.; RV: Pl. **12**, 48, fig. 2; LV: Pl. **12**, 48, fig. 3). All collected by J. Athersuch from localities in Cyprus during November, 1973. **1984.186** and **1984.188** are from sand in a small cove just North of Cape Greco (lat. 33° 55′N, long. 34° 10′E), water depth 10 m, salinity 39.4‰, temperature 21.5°C. **1984.187** was found in fine sand in Ayia Napa Harbour (lat. 34° 58′N, long. 34° 00′E), water depth 3 m, temperature 20°C.

Diagnosis: Carapace subquadrate, tapering slightly towards posterior; posterior margin truncate with ventral part bearing four distinct marginal denticles. Numerous intercostal fossae of varying size, often

Explanation of Plate 12, 46

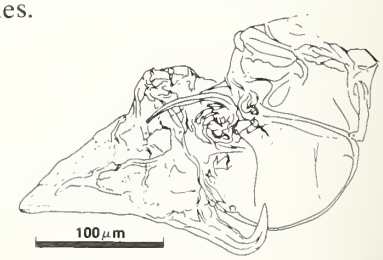
Figs. 1, 2, ♀ (**1984.186**, 720 μm long): fig. 1, LV, ext. lat.; fig. 2, RV, ext. lat.; fig. 3, ♂ RV, ext. lat. (**1984.187**, 760 μm long). Scale A (200 μm; × 80), figs. 1-3.

forming small clusters and frequently coalescing. Reticulum dominated by median and ventral longitudinal costae, which are not linked posteriorly or only weakly so. Seen internally, hinge line slightly below dorsal margin. Distal process of male copulatory appendage triangular, lamellar, with a curved, pointed prolongation at its anterior corner.

Remarks: *H.rubra* closely resembles *H.emaciata* (Brady, 1867) but differs in details of shape and ornament, particularly the disposition of the costae, and in the nature of the adult sexual dimorphism (see Athersuch & Horne, *Stereo-Atlas of Ostracod Shells* **12**, 39-44, 1985). The sexual dimorphism of the right valve, conspicuous in *H.emaciata*, is only weakly developed in *H.rubra*. Furthermore, on the basis of the limited number of specimens of the two species that we have seen, it appears that in *H.rubra* the male is the larger dimorph, while in *H.emaciata* the reverse is true.

Falunia capsula Uliczny, 1969 (*Hemicytheridae und Trachyleberidae (Ostracoda) aus dem Pliozän der Insel Kephallinia*, Dissertation, Univ. Munich) and *Cythereis rubra pontica* Caraion, 1967 [*Fauna Republicii Socialiste România*, **4**, *Crustacea*, *pt. 10 (Ostracoda)*; *Fam. Cytheridae (Ostracode marine şi salmastricole)*, 1-164, Bucarest] also appear to be very similar to *H.rubra* but require detailed examination before they can be assigned with certainty to this species. We consider that the larger size of the specimens reported by Bonaduce *et.al.* (1976, *op.cit.*) is not a sufficient difference to preclude them from being referred to this species.

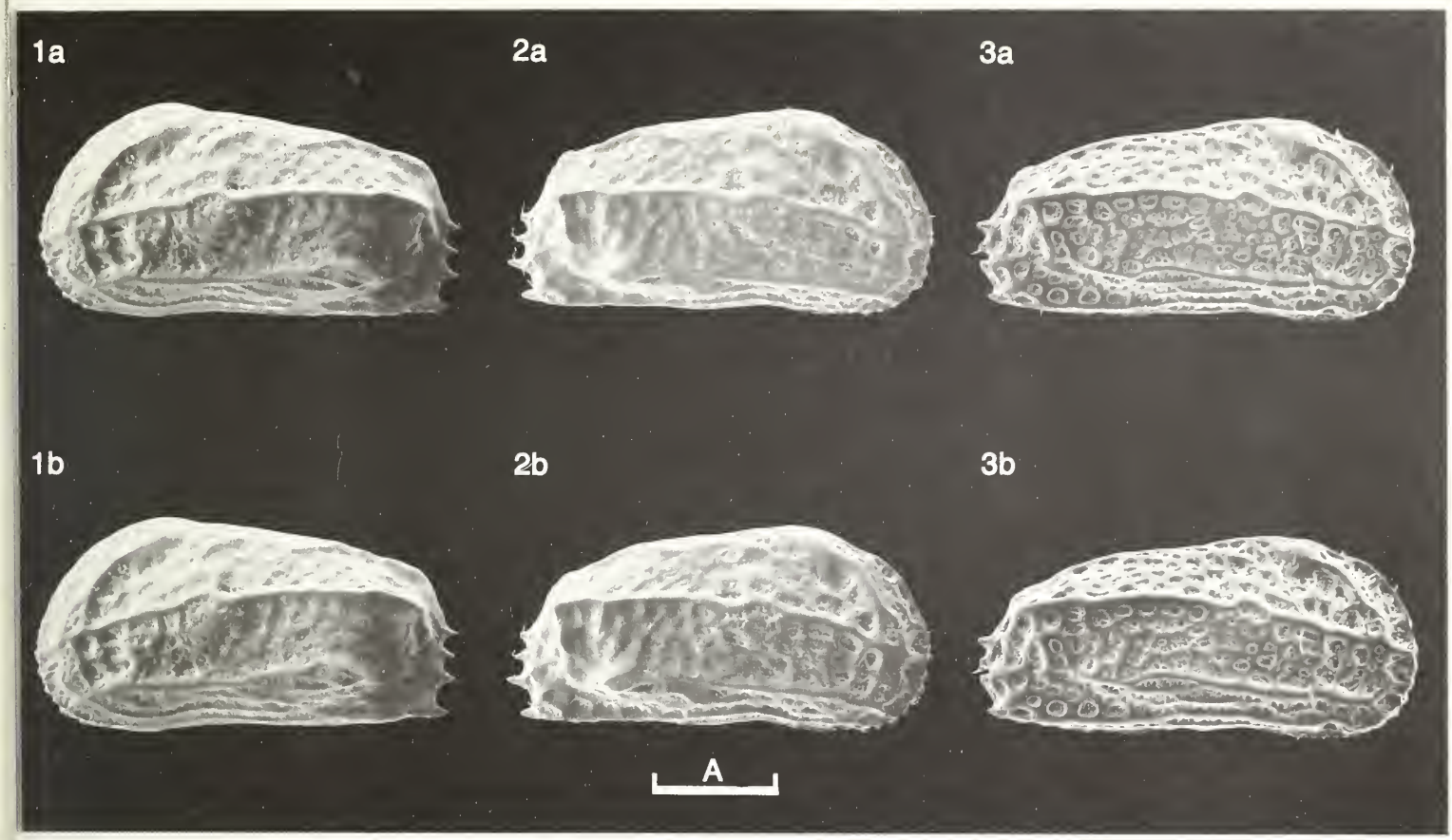
Distribution: Recent of the Mediterranean: Cyprus (herein), Greece (Barbeito-Gonzalez, *op.cit.*), Italy (Müller; Bonaduce *et al.*, *op.cit.*); ? Black Sea (Caraion, *op.cit.*). ?Pliocene of Greece (Uliczny, *op.cit.*). Because of the similarity of this essentially Mediterranean species to *H.emaciata*, all the records of both species require further investigation before their full geographical and stratigraphical distribution can be ascertained.



Text-figure 1. Male copulatory appendage (**1984.187**).

Explanation of Plate 12, 48

Figs. 1, 4, ♂ (**1984.187**, 760 μm long); fig. 1, LV, ext. lat.; fig. 4, RV, int. lat.; figs. 2, 3, ♀ (**1984.188**, 720 μm long); fig. 2, RV dors.; fig. 3. LV dors. Scale A (200 μm; × 80), figs. 1-4.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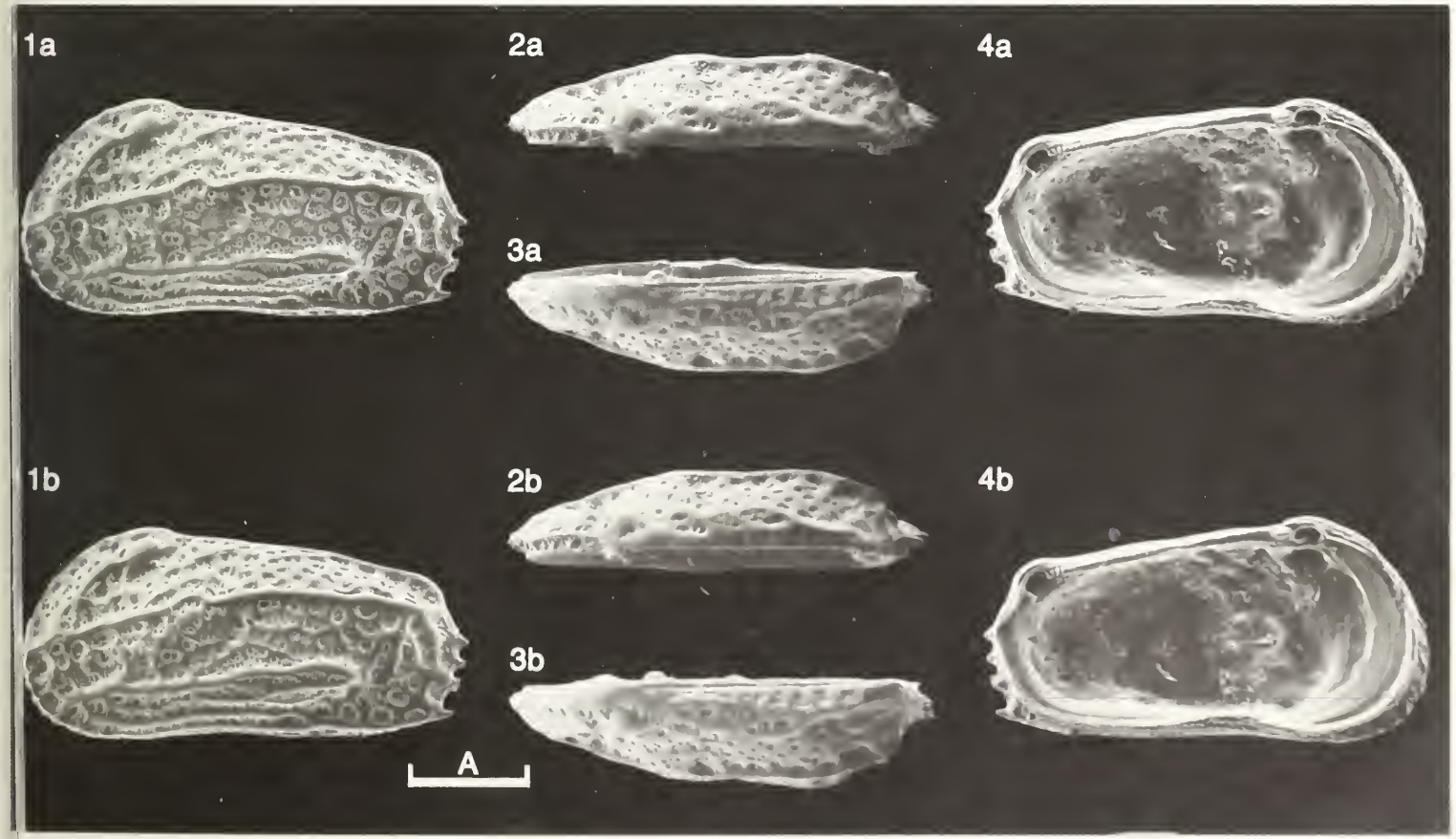
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595.336.13 (113.312) (429 : 162.005.51) : 551.35 + 552.55

ON *BREPHOCHARIEIS COMPLICATA* (Salter)

by David J. Siveter
(University of Leicester, England)

Genus BREPHOCHARIEIS gen. nov.
Type-species: *Beyrichia complicata* Salter, 1848

Derivation of name: Greek *brephos*, embryo + *charieis*, beautiful; resemblance of L1 + L2 to a foetus. Gender feminine.

Diagnosis: Quadrilobate tallinnelline. Lobes stout, equally elevated except for depressed dorsal half of L4, confluent with an evenly curved, rounded connecting lobe sited very close to velum in lateral view; laterovelar furrow virtually lacking. L2 short, straight, slopes towards the end of the posteriorly reflexed dorsal part of L1. L3, L1 and, to a lesser extent L4 have cusps above the dorsum. Sulci (S1–S3) well developed, as is infravelar antral dimorphism. Female dolon moderately wide, extends from near anterior cardinal corner to below S2, continues posteriorly (as in tecnomorphs) as a fine ridge along ventral part of the valve.

Remarks: The combined nature of its adventral structure, dimorphism (resembling that of the type-genus *Tallinnella*) and lobation indicate the tallinnelline affinities of *Brephocharieis*. However, it is readily distinguished from other, mainly middle Ordovician Baltic genera of the Tallinnellinae Schallreuter, 1976 (*Palaeontographica* (A), **153**, 165; also R. E. L. Schallreuter, *Geologie*, **15**, 200, 1966). Like *Tetrada, brephocharieis* lacks the distinctive laterovelar furrow (and very prominent velum) found in *Tallinnella* Öpik (type-species: *T. dimopha* Öpik, *Publ. Geol. Inst. Univ. Tartu.*, **50**, 24, 1937). *Brephocharieis* is distinguished from *Tetrada* Neckaja (type-species: *T. memorabilis* (Neckaja, 1953); see R. E. L. Schallreuter *Palaeontographica* (A), **153**, 166. 1976) by its more clearly differentiated quadrilobation and connecting lobe, more prominent antral dimorphism and its ventrally present velum in both dimorphs. *Homeokiesowia* Shallreuter (*Stereo-Atlas of Ostracod Shells*, **6**, 75–78, 1979) differs in having dissolved lobes, no connecting lobe and a wide, distinct velum.

Explanation of Plate 12, 50

Fig. 1, ♀ RV, ext. lat. (**OS 12576**, 2150 μm long); figs. 2–5, ♀ LV (**OS 12577**, 2270 μm long): fig. 2, ext. lat.; fig. 3, ext. ant.; fig. 4 int. vent. obl. showing antrum; fig. 5, ext. vent. Scale A (500 μm; × 25), fig. 1; scale B (500 μm; × 25), figs. 2–5.

Brephocharieis complicata (Salter, 1848)

1848 Beyrichia complicata, Salter; J. W. Salter *in*: J. Philips & J. W. Salter, Palaeontological appendix, *Mem. Geol. Surv. U.K.*, **2**, 234 (*pars*), 352 (*pars*), pl. 8, figs. 16, 16a.

1851 *Beyrichia complicata* (Salt.); F. McCoy *in*: A. Sedgwick & F. McCoy, *A synopsis of the classification of the British Palaeozoic Rocks* . . . (1), 1851, 136 (*pars*), *non* pl. 1E, figs. 3, 3a (= Sedgwick Museum, Cambridge, no. **A. 16696** = *Harperopsis scripta* (Harper, 1947)).

1852 *Beyrichia complicata*; J. W. Salter *in*; A. Sedgwick & F. McCoy, *Ibid.*, appendix A, ii (*pars*), *non* pl. 1E, figs. 3, 3a (= Sedgwick Museum, Cambridge, no. **A 16696** = *Harperopsis scripta* (Harper, 1947)).

1855 *Beyrichia complicata*, Salter; T. R. Jones, *Ann. Mag. nat. Hist.*, (2), **16**, 163–165 (*pars*), pl. 6, figs. 1–4, *non* fig. 5 (= on British Geological Survey London, slab no. **49449** = *Harperopsis scripta* (Harper, 1947)).

1868 *Beyrichia complicata* Salter; T. R. Jones & H. B. Holl, *Ann. Mag. nat. Hist.*, (4), **2**, 59 (*pars*).

1869 *B. complicata*, Salter; T. R. Jones, *On the Palaeozoic Bivalved Entomostraca*, 15, text-fig. 22, *non* 11, Hertford.

1881 *Beyrichia complicata*, Salter; J. W. Salter & R. Etheridge *in*: A. C. Ramsey, Geology of North Wales (2nd ed.), **3**, *Mem. Geol. Surv. U.K.*, 487 (*pars*), pl. 19, fig. 9, *non* 106, London.

1890 *Tetradella complicata*, Salter; E. O. Ulrich, *Jl. Cincinn. Soc. nat. Hist.*, **13**, 112.

non 1892 *Beyrichia complicata*, Salt.; T. E. Marr, *Geol. Mag.*, 108.

1908 *Tetradella complicata* (Salter); E. O. Ulrich & R. S. Bassler, *Proc. U.S. natn. Mus.*, **35**, 306.

1934 *Tetradella complicata* (Salter); R. S. Bassler & B. Kellett, *Spec. Pap. geol. Soc. Am.*, **1**, 190, 480 (*pars*).

1938 *Beyrichia complicata* Salter; C. J. Stubblefield, *Summ. Progr. geol. Surv.*, pt. 2 (for 1936), 35.

1947 *Tetradella complicata* (Salter); J. C. Harper, *Geol. Mag.*, **84**, 346, pl. 10, fig. 3.

1963 *Tallinnella complicata* (Salter); N. Spjeldnaes, *Palaeontology*, **6**, 255, pl. 36, figs. 9–13, text-fig. 1.

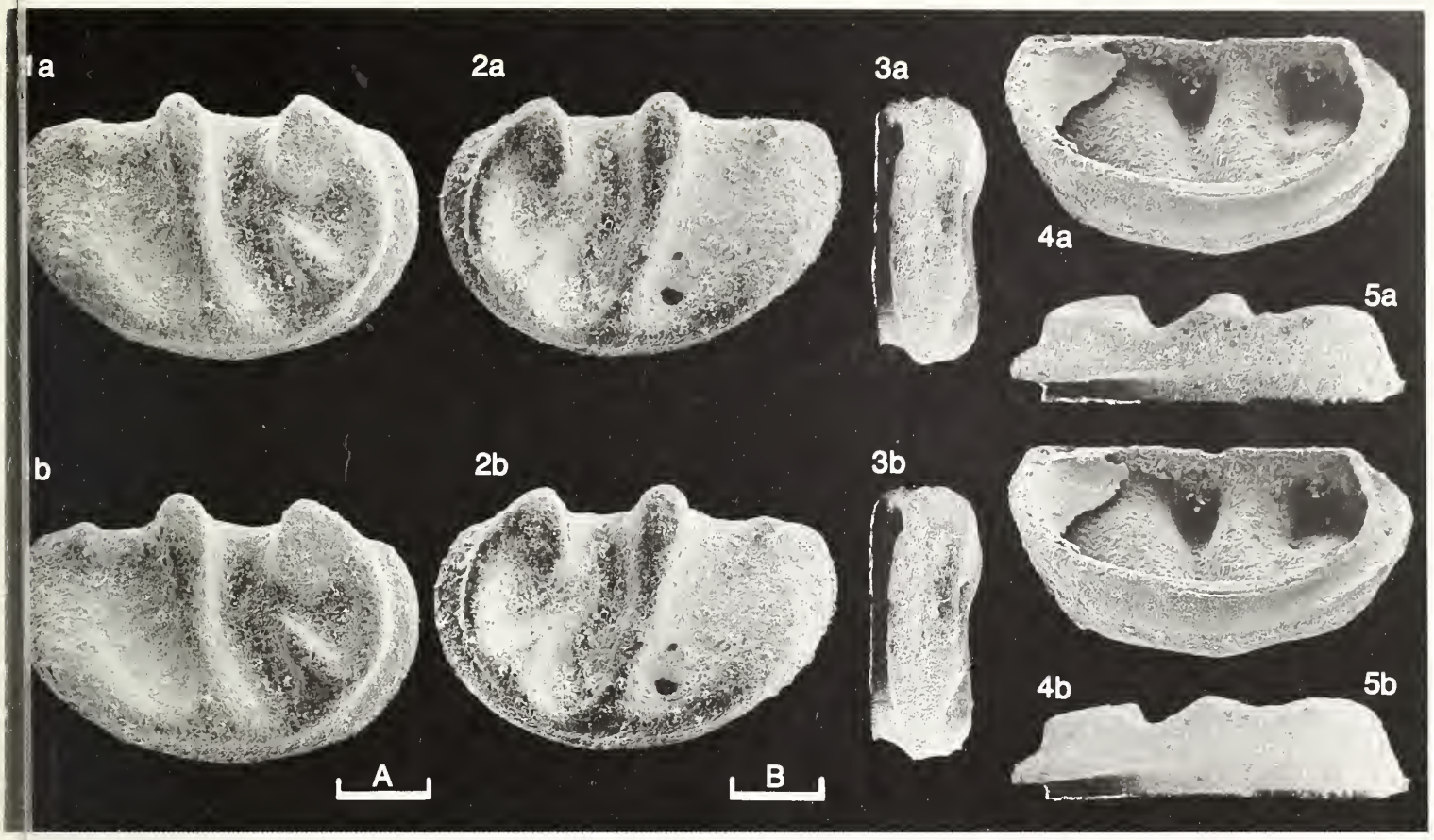
1966 *Gunnaropsis complicata*; R. E. L. Schallreuter, *Geologie*, **7**, 853.

1966 *Cerninella (Cerninella) complicata* (Salter, 1848); A. Přibyl, *Čas. Národního Musea, odd, přírod.*, **135**, 206–207 (*pars*); *non* pl. 2, figs. 4–9, text-figs. 4a–c.

1977 *Tetradella complicata* Salter; F. M. Swain *in*: F. M. Swain (ed.), *Stratigraphic Micropaleontology of Atlantic Basin & Borderlands*, 29, fig. 3 (34), Elsevier, Amsterdam.

Explanation of Plate 12, 52

Fig. 1, ♂ RV, ext. lat. (**OS 12574**, 2125 μm long); figs. 2–5, ♂ LV (**OS 12575**, 2125 μm long): fig. 2, ext. lat.; fig. 3, ext. ant.; fig. 4, detail of ext. vent. showing ornament and velum; fig. 5, ext. vent. Scale A (500 μm; × 25), figs. 1–3, 5; scale B (200 μm; × 62), fig. 4.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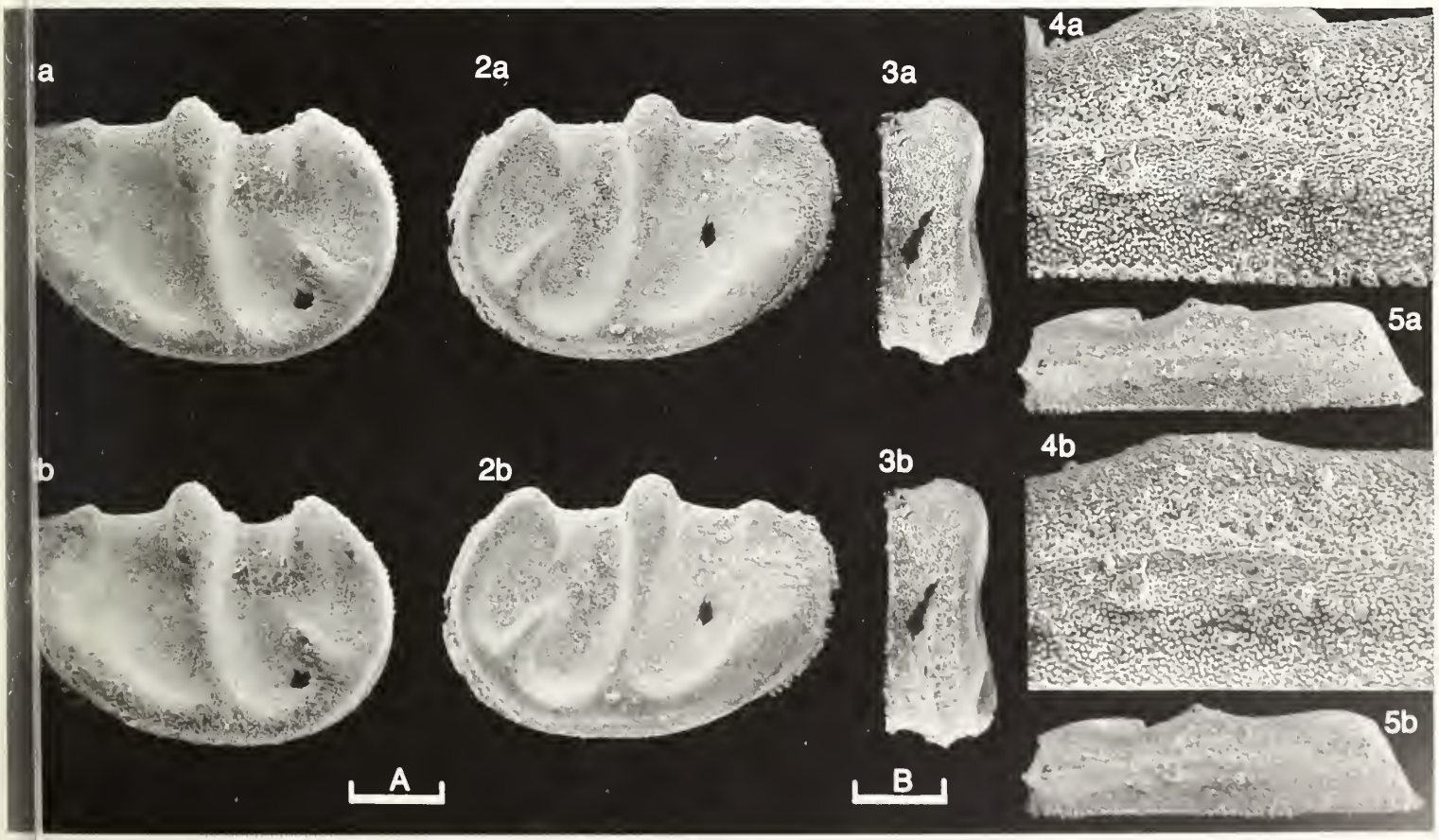
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1978 *'Tallinnella' complicata* (Salter, 1848); D. J. Siveter *in*: R. H. Bate & E. Robinson (eds.), A Stratigraphical Index of British Ostracoda, *Geol. J.* special issue **8**, 41, 43, 45, 48, pl. 1, figs. 7, 8.

1979 *Cerninella complicata* (Salter, 1848); A. Přibyl, *Sbornik Národního Musea* (B), **33** (for 1977), 67–68 (*pars*), pl. 3, figs. 1, 2, *non* pl. 3, figs. 3–7, text-figs. 3(3–5), 10 (1), 11 (4), 16 (2).

Lectotype: Designated herein [the neotype designation of Přibyl (1966, 206) is invalid]. A left valve tecnomorph (*not* heteromorph as stated by Přibyl 1979, 143); internal and external moulds on rock pieces of British Geological Survey Museum, London, nos. **GSM 24525** and **GSM 24526** (= part and counterpart) respectively. The internal mould was figured by Jones 1855 (pl. 6, fig. 3) and Přibyl 1979 (pl. 3, fig. 1). The original of *'Beyrichia' complicata* of Jones 1855, pl. 6, fig. 4 (= a tecnomorphic right valve internal mould) is also on **GSM 24525**. From Llan Mill (see 'Type locality').

The specimens of Jones on **GSM 24525** and **24526** are part of Salters 1848 syntype collection: they were considered as "lectosyntypes" by Stubblefield (*op. cit.*) and Harper (*op. cit*); furthermore, the pieces were catalogued in 1848 (Museum labels) and Jones (1855, 163, 164) acknowledges Salters' help and the use of 'Museum of Practical Geology' (= GSM) specimens.

The specimens of *'Beyrichia' complicata* of Jones 1855, pl. 6, figs. 1, 2 are wax casts of left and right valve tecnomorphs respectively, now in the British Museum (Nat. Hist.), London, no. **I 6323**; the original external moulds, from Llan Mill, have not been identified but the probability is that they were also taken from amongst the many external moulds on the original slabs held by the British Geological Survey. Topotype rock piece **GSM 24527**, containing the original of Harper 1947 (*op. cit.*, pl. 10, fig. 3 = a heteromorphic left valve internal mould), is also possibly syntype material (Stubblefield 1938). **GSM 24525**, **24526** and **24527** contain tens of moulds of *B. complicata*.

The original of *'Beyrichia' complicata* of Jones 1855, pl. 6, fig. 5, is a small tecnomorphic left valve from Harnage, Shropshire, on British Geological Survey, London, slab no. **49449** and belongs to *Harperopsis scripta* (Harper, 1947); see C. R. Jones & D. J. Siveter, *Stereo-Atlas of Ostracod Shells*, **10**, 5–12, 1983. Museum label and catalogue information claim the original of Jones 1855 pl. 6, fig. 5, is British Museum (Nat. Hist.) no. **I 6325**, a single larval quadrilobate palaeocope also from Harnage. As Jones states (1855, 164) that the original is in the 'Museum of Practical Geology', the specimen in the British Museum is considered not to be the figured specimen.

Explanation of Plate 12, 54

Fig. 1, ♀ LV, ext. lat. (**OS 12581**; 2025 μm long); figs. 2, 3, ♂ RV (**OS 6665**, 2180 μm long): fig. 2, ext. lat.; fig. 3, ext. post.; fig. 4, ♀ RV, ext. lat. (**OS 6666**, 2050 μm long). Scale A (500 μm; × 26), figs. 1, 4; scale B (500 μm; × 25), figs. 2, 3.

Type locality: Llandeilo 'Flags' at Llan Mill (= Lann Mill of Salter 1848), 3 km E of Narbeth, Dyfed, S Wales; Nat. Grid Ref.: SN 139 143. The precise locality and horizon is unknown but the hillside quarry 200 m NW of Llan Mill Farm is the probable locality; it lies within the Bryn-glass Limestone Member, Lampeter Velfrey Formation, Narberth Group of Addison 1974, Unpublished Ph.D. thesis, Queen's University, Belfast) and is of probable upper Llandeilo age.

Figured specimens: British Museum (Nat. Hist.) nos. **OS 6665** (♂ RV: Pl. **12**, 54, figs. 2, 3), **OS 6666** (♀ RV: Pl. **12**, 54, fig. 4), **OS 12573** (tecnomorphic LV: Pl. **12**, 56, figs. 2–4), **OS 12574** (♂ RV: Pl. **12**, 52, fig. 1), **OS 12575** (♂ LV: Pl. **12**, 52, figs. 2–5), **OS 12576** (♀ RV: Pl. **12**, 50, fig. 1), **OS 12577** (♀ LV: Pl. **12**, 50, figs. 2–5), **OS 12578** (tecnomorphic LV: Pl **12**, 56, figs. 5, 6), **OS 12579** (♀ RV: Pl. **12**, 56, fig. 1), **OS 12581** (♀ LV: Pl. **12**, 54, fig. 1).

All specimens are silicified; obtained by acid preparation of limestone from the old quarry *c.* 300 m S of Cwm Agol Farm, *c.* 8 km W of Llandeilo, Dyfed, S Wales; appox. lat 51°51′N, long. 4°05′W (Nat. Grid Ref.: SN 5655 2070). Llandeilo 'Flags', Llandeilo Series, Ordovician.

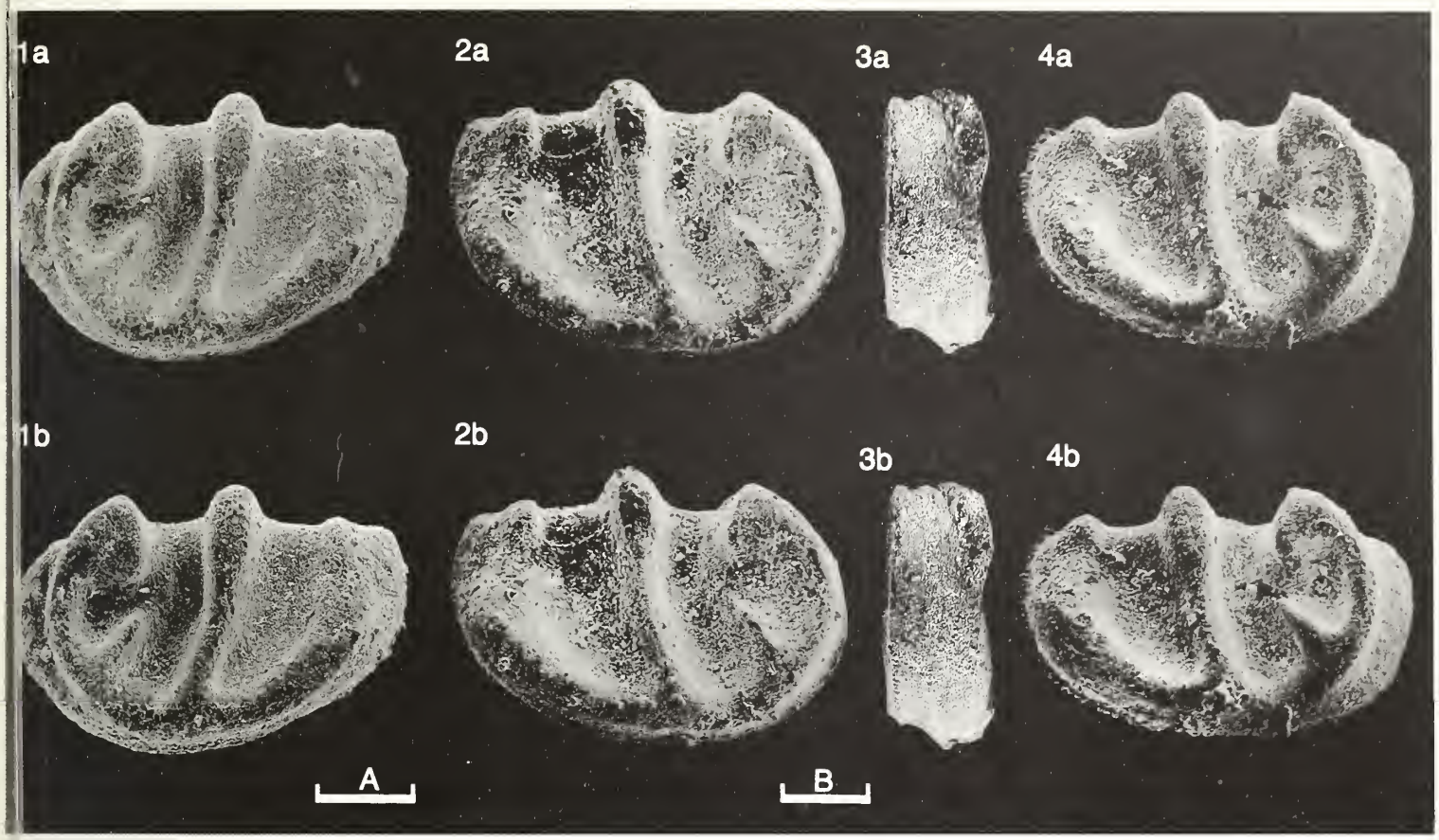
Diagnosis: As for the genus. *Brephocharieis* is at present monotypic.

Remarks: *'Beyrichia' complicata* was the first ostracode species erected from the British Ordovician (Siveter 1978, 41). Within the silicified material described herein there is notable size variation (mixed chronodemes/ecodemes?) of females (length, including dolon: *c.* 1900–2270 μm) within a single, acid prepared sample (e.g. Pl. **12**, 54, figs. 1, 3 cf. Pl. **12**, 56, fig. 1). Moreover, some of the smaller females (Pl. **12**, 56, fig. 1) appear to have relatively more constricted lobes (possibly a factor of size or preservation). A tendancy to develop more constricted lobes (not quite cristation) is also seen in younger instars (e.g. Pl. **12**, 56, fig. 5).

Distribution: Llandeilo Series around Narberth and Llandeilo, S Wales. The range has now been extended (C. Jones, in prep.) to include the upper Llanvirn and the Costonian Stage, Caradoc Series of that area.

Explanation of Plate 12, 56

Fig. 1, ♀ RV, ext. lat. (**OS 12579**; 1950 μm long); figs. 2–4, tecnomorphis LV (**OS 12573**; 1625 μm long): fig. 2, ext. lat., fig. 3, ext. vent.; fig. 4, detail anterodors.; figs. 5, 6, tecnomorphic LV (**OS 12578**; 1500 μm long): fig. 5, ext. lat.; fig. 6, ext. vent. Scale A (500 μm; × 25), figs. 1–3, 5, 6; scale B (200 μm; × 75), fig. 4.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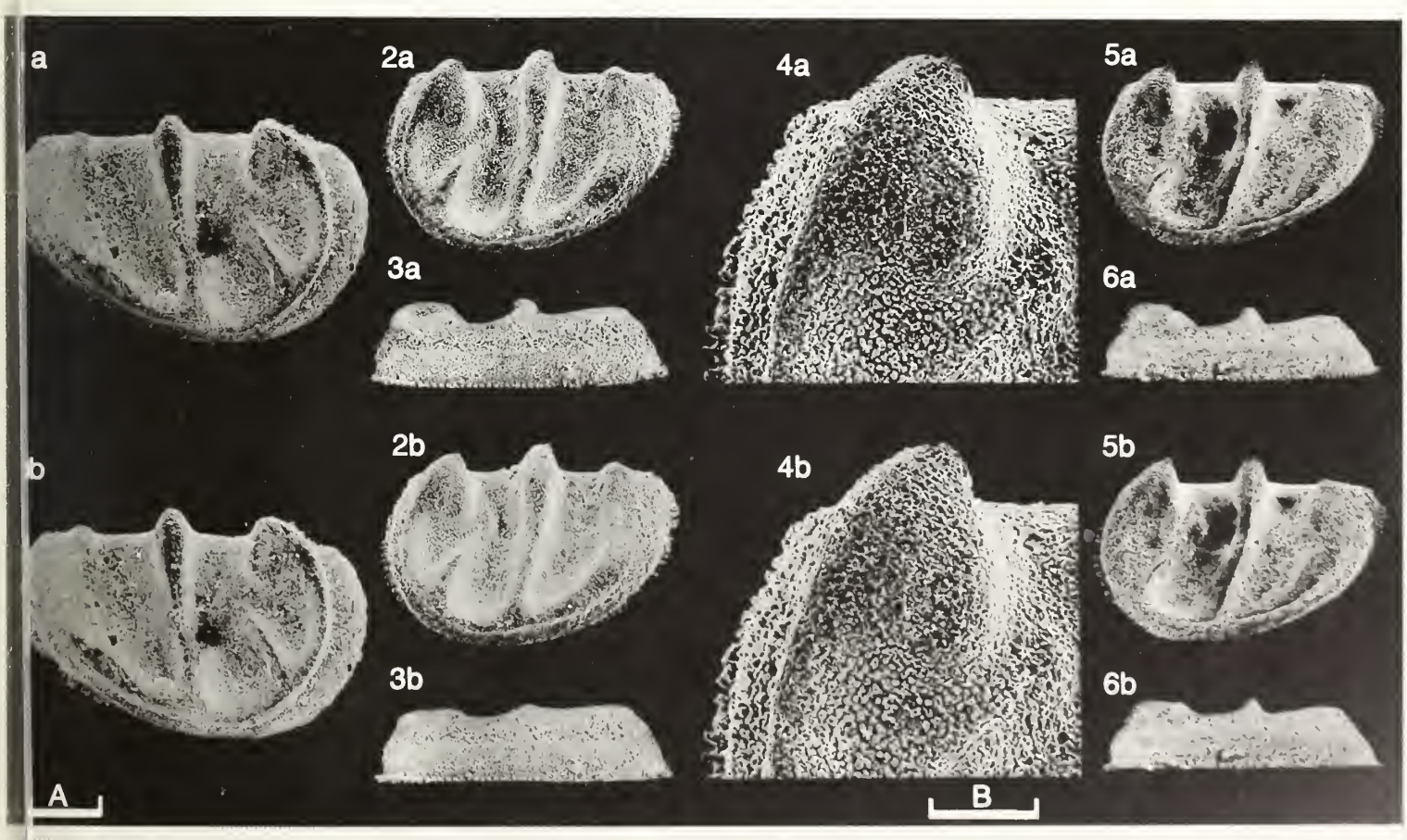
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593.336.13 (113.312) (430.1 : 161.011.55) : 55.35 + 552.55

ON *HENNINGSMOENIA GUNNARI* (THORSLUND)

by R. J. Orr
(Queen's University of Belfast, Northern Ireland)

Genus *HENNINGSMOENIA* Schallreuter, 1964

1964 *Henningsmoenia* gen. nov.; R. E. L. Schallreuter, *Ber. geol. Ges. DDR*, **2**, 91.

Type-species (by original designation): *Winchellatia gunnari* Thorslund, 1948

Diagnosis: Unisulcate Steusloffiinae with a long sigmoidal S2. Preadductorial node a low bulb or indistinct. Plica weak. Posteroventral lobe with a ridge-like crista; crista short or long. Female velum with a S-like step anterocentrally and a ridge-like torus; tecnomorphs with or without torus. Antrum botulate and dolonal. Lateral surface tuberculate or pustulate and also maybe finely reticulate.

Henningsmoenia gunnari (Thorslund, 1948)

1948 *Winchellatia gunnari* sp. nov. P. Thorslund *Bull. geol. Instn. Univ. Upsala*, **23**, 368, pl. 20, figs. 2, 3.

1976 *Henningsmoenia gunnari* (Thorsland); R. E. L. Schallreuter, *Palaeontographica* (A) **153**, (4/6), 199, pl. 7, figs. 1-8.

1982 *Henningsmoenia gunnari* (Thorsland); L. K. Gailīte, *in*: R. Z. Ulst, L. K. Gailīte & V. I. Yakovleva, *Ordovician Latvia*, 119, 124, 130, 191. Riga.

1983 *Henningsmoenia gunnari* (Thorsland); R. E. L. Schallreuter, *Palaeontographica* (A) **180**, (4/6), 178, pl. 11, fig. 7 (*q. v.* for full synonomy).

1984 *Henningsmoenia gunnari* (Thorslund); R. E. L. Schallreuter, *Geol. För. Stockh. Förh.*, **101**, 95.

Holotype: Palaeontological Institute, University of Uppsala, Sweden; tecnomorphic left valve (listed as a right valve in Thorslund 1948, 373, pl. 20, fig. 2).

Type locality: Kullatorp core (depth 65.05m), Kinnekulle, Vastergotland, Sweden; approx. lat. 58° 30′N, long. 13° 25′E. Skagen Limestone (= Johvi Stage), middle Ordovician.

Explanation of Plate 12, 58

Figs. 1, 3, ♀ LV (**K 10034**, 1020 μm long): fig. 1, ext lat.; fig. 3, ext. obl. vent. Figs. 2, 4, ♀ RV (**K 10035**, 1030 μm long): fig. 2, int. ant. showing part of antrum; fig. 4, int. lat. Scale A (250 μm; × 65), figs. 1, 3, 4; scale B (100 μm; × 86), fig. 2.

Figured specimens: Ulster Museum, Belfast, nos. **K 10034** (♀ LV: Pl. **12**, 58, figs. 1, 3), **K 10035** (♀ RV: Pl. **12**, 58, figs. 2, 4; Pl. **12**, 60, fig. 2), **K 10036** (tecnomorphic RV: Pl. **12**, 60, figs. 1, 3) and **K 10037** (juv. RV: Pl. **12**, 60, fig. 4). All specimens are silicified, from Backsteinkalk erratic boulder no. Stb 1, from Staberhuk, Isle of Fehman, near Puttgarden, West Germany. Backsteinkalk boulder Type 1B1; source = ? Skagen Limestone, Sweden (Schallreuter, *Palaeontographica* (A), **44**, (1/3), 65, 1973). Sample courtesy of Dr. R. E. L. Schallreuter.

Diagnosis: *Henningsmoenia* species with a small, bulb-like preadductorial node. Plica weak, only developed either side of sulcus. Posteroventral crista short, posterior end spine-like, merges with valve posterior to sulcus. Adult male and female similar in lateral view. Anterocentrally female velum follows a S-like course. Female torus strong; broad dolonal botulate antrum; tecnomorphic torus weak to absent. Right valve with a narrow ridge proximal to the free margin. Primary surface ornament pustulate; second-order ornament a fine reticulation, often missing.

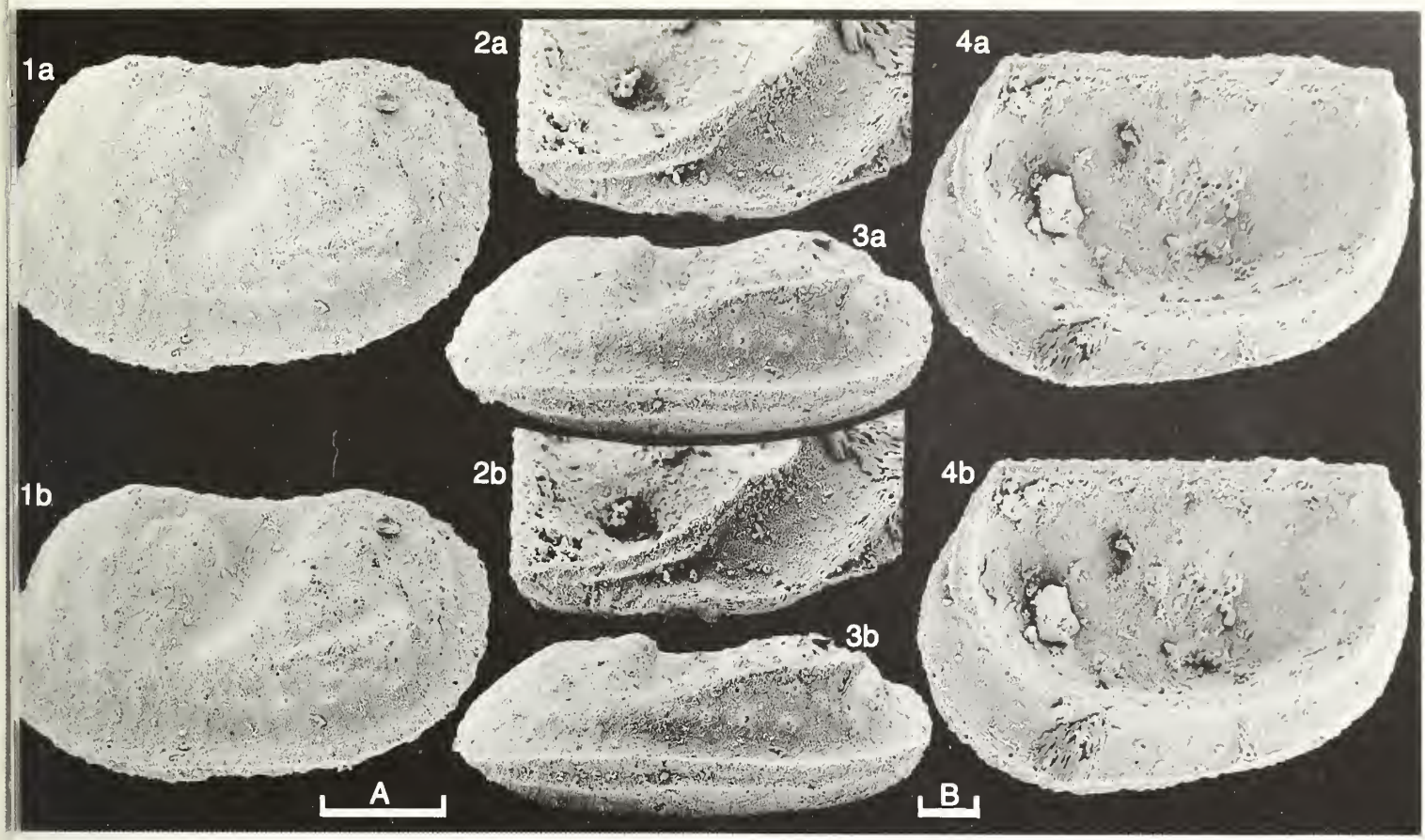
Remarks: The fine reticulation of *Henningsmoenia gunnari* is illustrated for the first time herein. In early juvenile specimens the crista is represented only by a weak posterior spine. This juvenile crista is similar to that seen in the female of *Henningsmoenia billingensis* Schallreuter (*op. cit.*, 95, fig. 3, 1984) from the Upper Dalby Limestone (= Idavere Stage). In *Henningsmoenia costa* Orr (*Stereo-Atlas of Ostracod Shells*, 12, 61-68, 1985), from the upper Ordovician, the crista is complete to the anterodorsal margin.

Distribution: Middle Ordovician of the Baltic and Scandinavia: Skagen Limestone (Johvi [D_I] Stage), Siljan district and Vastergotland, Sweden; Lower Chasmops Shale (Idavere [C_{III}] Stage), Oslo Region, Norway; Auleliai Member (upper C_{III}, lower D_I), Lithuania; Adze and Blidene formations (C_{III}, D_I and Keila [D_{II}] Stage, Western Latvia; Svjantusk Member (C_{III}) and Auleliai Member, Eastern Latvia.

Explanation of Plate 12, 60

Figs. 1, 3, tecnomorphic RV (**K 10036**, 860 μm long): fig. 1, ext. lat.; fig. 3, ext. obl. vent. fig. 2, ♀ RV, int. vent., detail of torus, velum and margin (**K 10035**); fig. 4, juv. RV, ext. lat. (**K 10037**, 520 μm long).

Scale A (250 μm; × 78), fig. 1; scale B (250 μm; × 82), fig. 3; scale C (50 μm; × 115), fig. 2; scale D (250 μm; × 125), fig. 4.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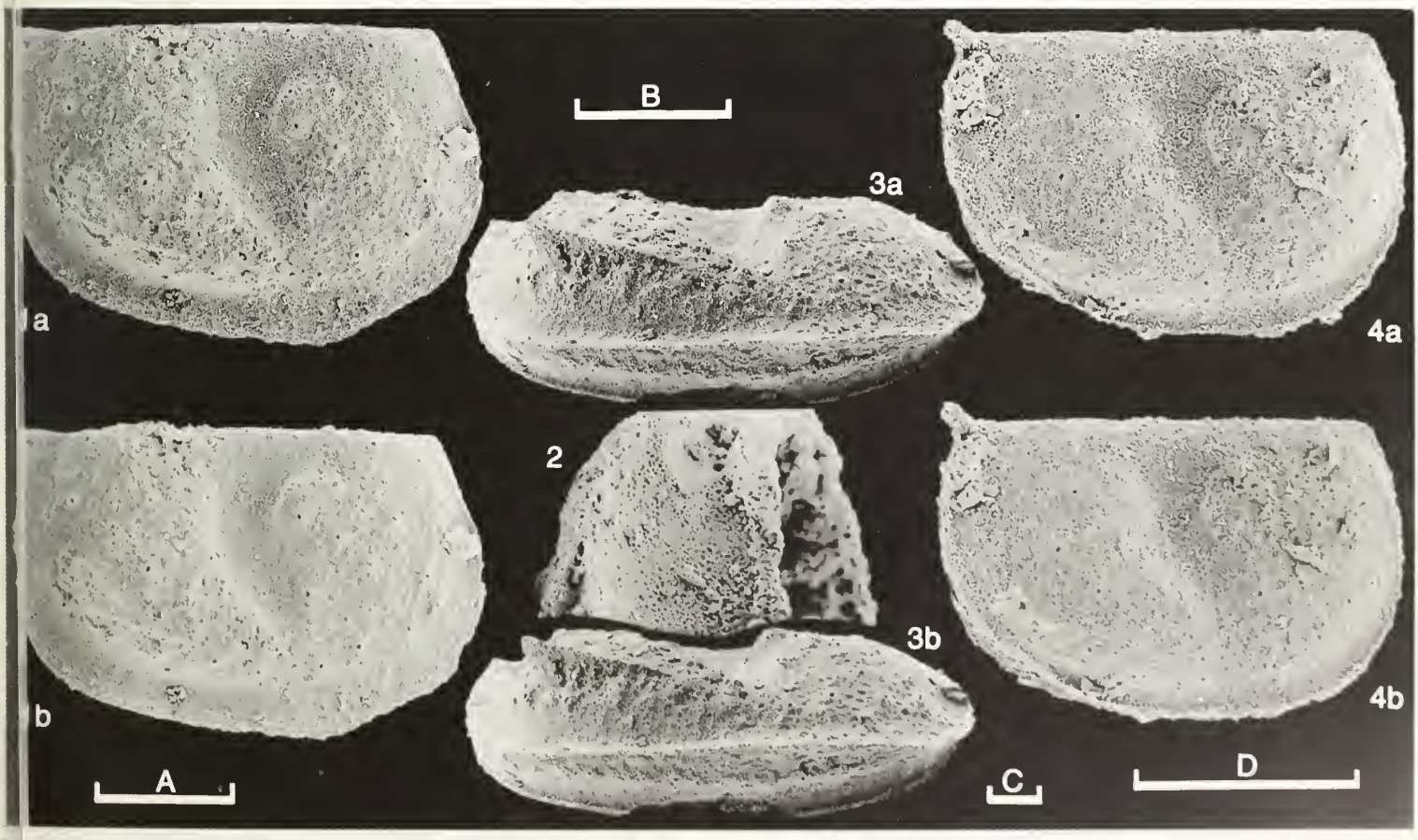
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595.336.13 (113.313) (415 : 162.007.53) : 551.35 + 552.55

ON *HENNINGSMOENIA COSTA* ORR sp. nov.

by R. J. Orr
(Queen's University of Belfast, Northern Ireland)

Henningsmoenia costa sp. nov.

Holotype: Ulster Museum, Belfast, no. **K 10024**; ♀ RV.

Type locality: SW facing cliff, small cove about 230 m SW of renovated Martello Tower, 800 m SE of Portrane, Co. Dublin, Eire; approx. lat. 53° 29′N, long. 6° 06′W (Nat. Grid.: 0 257504). Bed 7, Locality CN, Lower Limestones Member, Portrane Limestone; Cautleyan, Ashgill Series, upper Ordovician.

Derivation of name: Latin *costa*, rib; referring to the prominent ridge.

Figured specimens: Ulster Museum, Belfast, nos. **K 10024** (holotype, ♀ RV: Pl. **12**, 62, fig. 1), **K 10025** (♀ RV: Pl. **12**, 62, fig. 2; Pl. **12**, 66, figs. 1, 3), **K 10026** (♀ RV: Pl. **12**, 62, fig. 3; Pl. **12**, 66, fig. 2), **K 10027** (♂ LV: Pl. **12**, 62, fig. 4; Pl. **12**, 64, fig. 5; Pl. **12**, 68, fig. 1), **K 10028** (♀ LV: Pl. **12**, 62, fig. 5), **K 10029** (♂ LV: Pl. **12**, 64, figs. 1, 2), **K 10030** (juv. RV: Pl. **12**, 64, fig. 3), **K 10031** (♂ LV: Pl. **12**, 64, fig. 4), **K 10032** (tecnomorphic car.: Pl. **12**, 68, fig. 2) and **K 10033** (♀ LV: Pl. **12**, 68, fig. 3).

Specimen **K 10026** is from Bed 9 and **K 10027** and **K 10031** are from Bed 22 of loc. F, SW facing cliff, about 145 m SW of type locality, Lower Limestones Member, Portrane Limestone. The other specimens are from the type locality. All the material is coarsely silicified.

Diagnosis: Species of *Henningsmoenia* in which the posteroventral crista continues to the anterodorsal border. Plica weak to absent. Female velum with diagnostic S-like step anterocentrally. No torus in tecnomorph, possible torus in female. Marginal sculpture: a narrow marginal ridge in right valve and a narrow admarginal ridge in left valve.

Explanation of Plate 12, 62

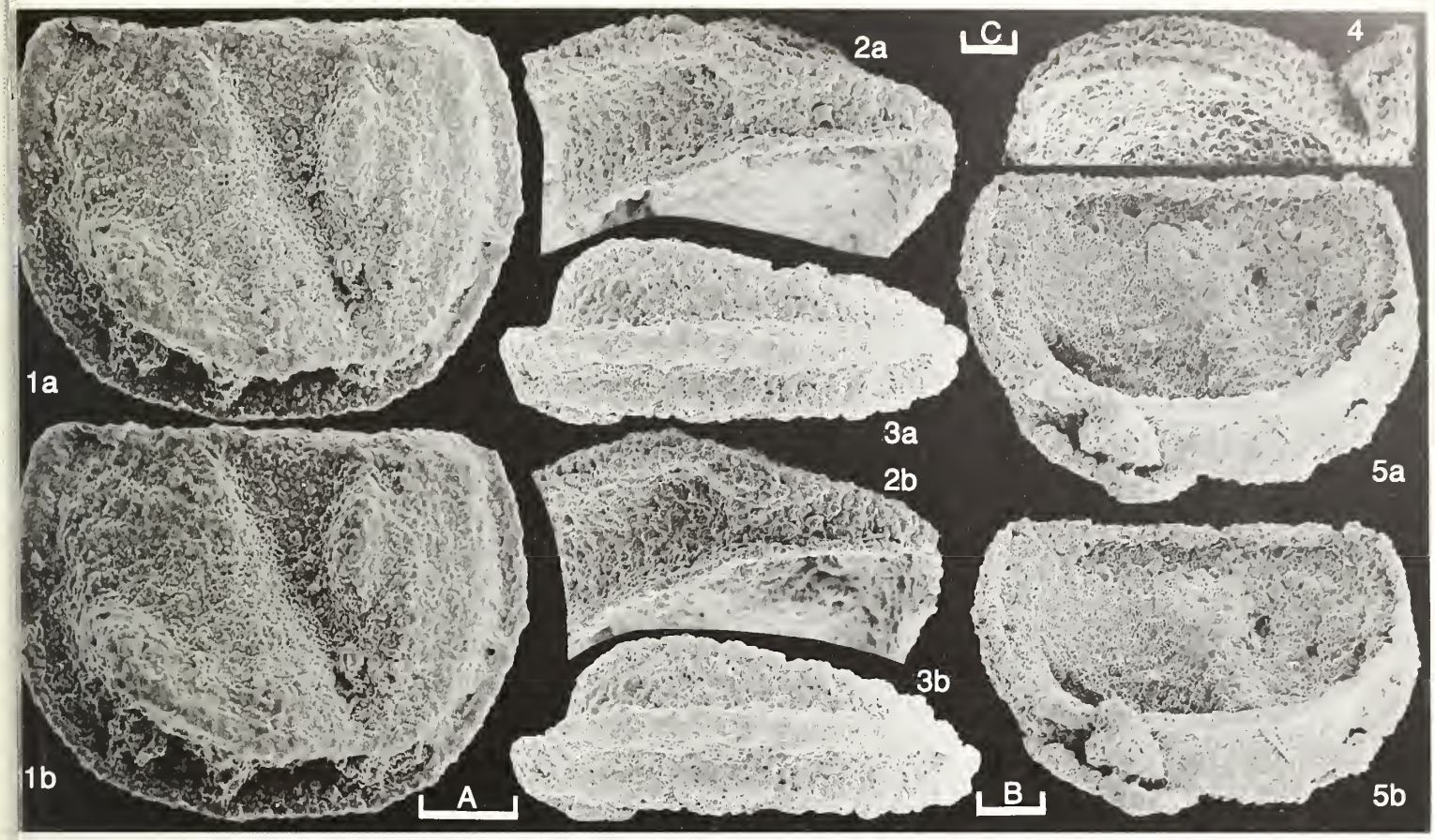
Fig. 1, ♀ RV, ext. lat. (holotype, **K 10024**, 1110 μm long); fig. 2, ♀ RV, int. ant. velum and antrum (**K 10025**, 1005 μm long); fig. 3, ♀ RV, ext. vent. (**K 10026**, 1101 μm long); fig. 4, ♂ LV, int. ant. velum (**K 10027**, 1200 μm long); fig. 5, ♀ LV, int. lat. showing antrum (**K 10028**, 930 μm long). Scale A (200 μm; ×65), figs. 1, 3, 5; scale B (100 μm ×85), fig. 2; scale C (100 μm; ×70), fig. 4.

Remarks: *Henningsmoenia costa* is the youngest recorded species of the genus. The older species assigned to the genus display a progressive elongation of the crista on the wing-like posteroventral structure. In *H. billingensis* Schallreuter (*Geol. För. Stockh. Förh.*, **106**, 95, 1984), from the upper Member of the Dalby Limestone (Idavere [C_{III}] Stage), only a short posterior spine is present. In the type-species, *H. gunnari* (Thorslund, 1948) from the Skagen Limestone (Johvi [D_I] Stage; overall stratigraphic range = Idavere to Keila [D_{II}] Stage), the short crista extends from the posterior spine to posterior of the sulcus (see Orr, *Stereo-Atlas of Ostracod Shells*, **12**, 57, 1985). In *H. costa* this restricted crista has developed into a long ridge which extends to the anterodorsal border. On first examination this ridge might appear to be histial in position. However, a closer examination of some specimens (see Pl. **12**, 64, figs. 4, 5, and Pl. **12**, 68, figs. 1, 2) reveals that between the ridge and the velum there is a bend in the histial position.

The oldest specimens of *H. costa* are from the lower Member of the Portrane Limestone (loc. F, bed 48) of Pirgu [F_{IC}] age. Thus, there is a long stratigraphic interval between the youngest record of *H. gunnari* and the introduction of *H. costa*. In terms of its lateral morphology and stratigraphic distribution (Nabala [F_{IA}] to Lower Pirgu [F_{IC}] Stage) *'Ordovicia' pictis* Neckaja (*Trudȳ VNIGRI*, **115**, 1958) would appear to partly fill this gap. However, even though the exact nature of its female dimorphic structures are unclear, both Schallreuter (*Palaeontographica*, (A), **178**, (1/3), 34, 1982) and Gailīte (*Ordovician Latvia*, 120, 1982, Riga) assign the species to *Sigmobolbina* Henningsmoen. According to this interpretation *'O'. pictis* represents an homeomorph of *Henningsmoenia*. *H. costa* is homeomorphic with other, approximately contemporaneous species such as the Baltic *Naevhithis naevus* Schallreuter (*Stereo-Atlas of Ostracod Shells*, **8**, 137-140, 1981) and ? *Pelecybolbina kolkaensis* Gailīte (*In*: Grigelis, A. A. (Ed.): *The fauna and stratigraphy of Palaeozoic and Mesozoic of Baltic and Byelorussia*, 61, 1975, Vilnius). The female of *H. costa* has the anteroventral step to the velum also seen in *H. gunnari* and *N. naevus*. However, *N. naevus* lacks the crista and torus which are indicative of *Henningsmoenia*.

Explanation of Plate 12, 64

Fig. 1, 2, ♂ LV (**K 10029**, 1200 μm long): fig. 1, ext. lat.; fig. 2, ext. vent.; fig. 3, juv. RV, ext. lat. (**K 10030**, 620 μm long); fig. 4, ♂ LV, int. vent. (**K 10031**, 1010 μm long); fig. 5, ♂ LV, int. vent. detail of margin and velum (**K 10027**, 1200 μm long).
Scale A (200 μm; ×55), figs. 1, 2; scale B (200 μm; ×100), fig. 3; scale C (200 μm; ×72), fig. 4; scale D (50 μm; ×140), fig. 5.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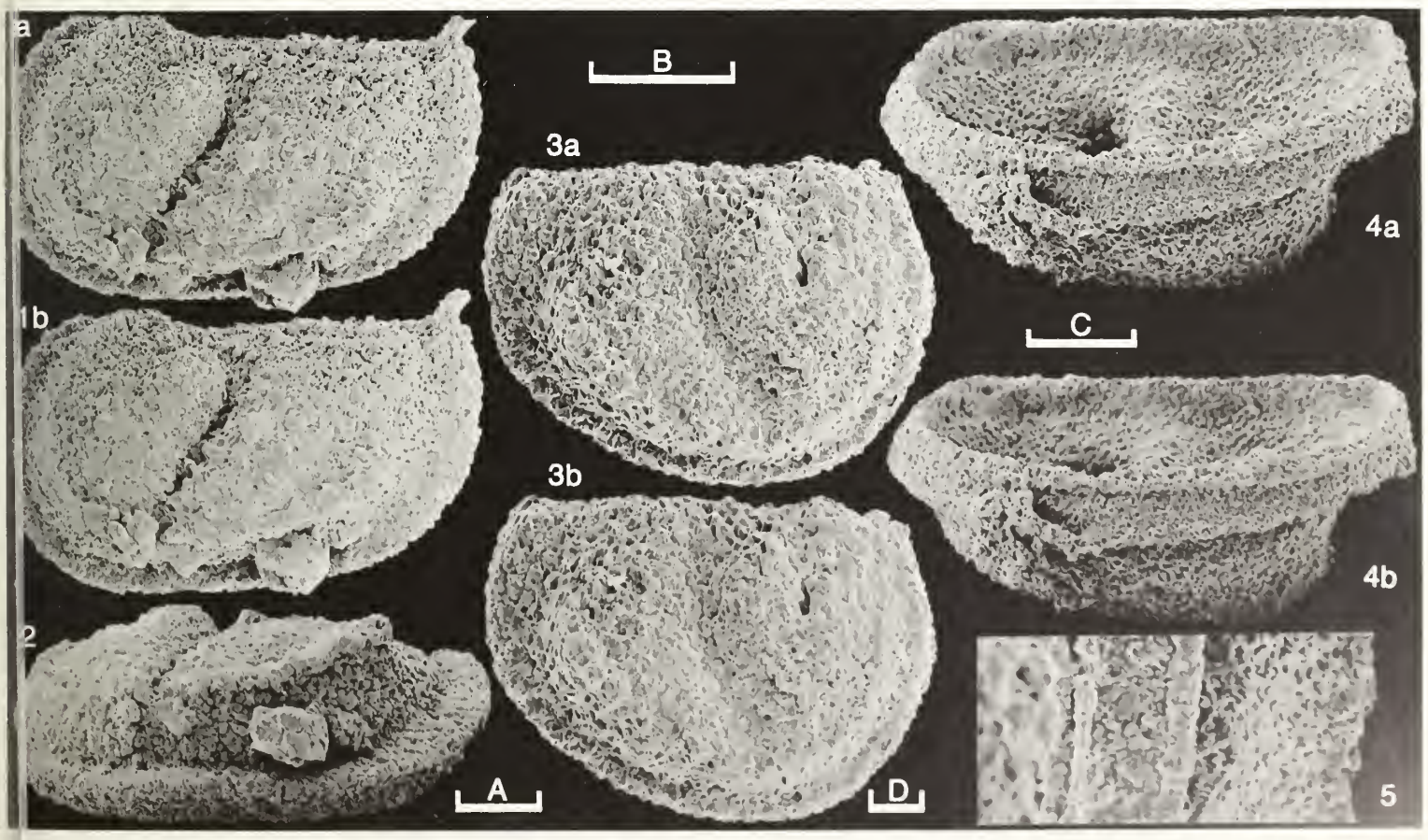
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Remarks (contd.): In *H. gunnari* and *H. billingensis* the distal edge of the velum is split ventrally to provide a ridge-like torus. In *H. costa* a clear corresponding feature is not immediately apparent, but in female specimens the distal end of the velum is much thicker than in the tecnomorphs (see especially Pl. **12**, 66, fig. 1). This thickened velar border probably corresponds to a separate velum and torus, but because of the coarseness of the silicification the individual ridges have coalesced. In one specimen (Pl. **12**, 68, fig. 3) three narrow contiguous ridges are visible and may represent one velar and two toric ridges.

A further difference between *H. costa* and *H. gunnari* is the nature of the contact margin. In *H. gunnari* the right valve has a contact list and an admarginal ridge and the left valve an inner semi-sulcus. By contrast in *H. costa* the right valve has a marginal ridge and the left valve an admarginal ridge (see Text-fig. 2). The precise contact structure present in *H. billingensis* is unknown.

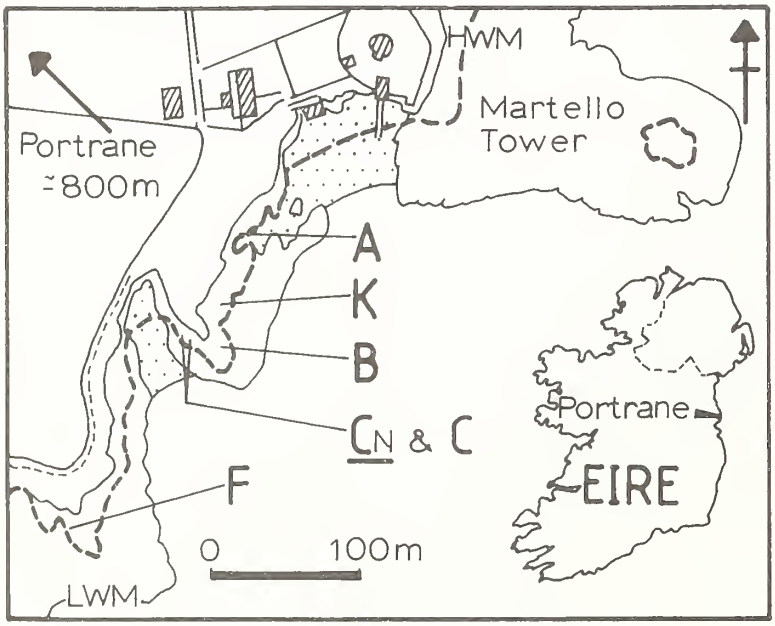
'Sigmobolbina' cuneata Abushik & Sarv (*Paleontologija Drevnego Palaozoja Pribaltiki i Podolii*, 107, pl. 2, figs. 6-8, 1983), from the Molodovo Stage (= Nabala Stage), may also belong to *Henningsmoenia*, though in this species there is no distinct crista and it more likely belongs in *Naevhithis*.

Distribution: See text-fig. 1. Lower Limestones Member (locs. F, C, CN), Main Limestones Member (loc. B), Upper Limestones Member (locs. B, K, A), Portrane Limestone, Portrane, Eire: Cautleyan to Lower Rawtheyan, Ashgill Series, upper Ordovician.

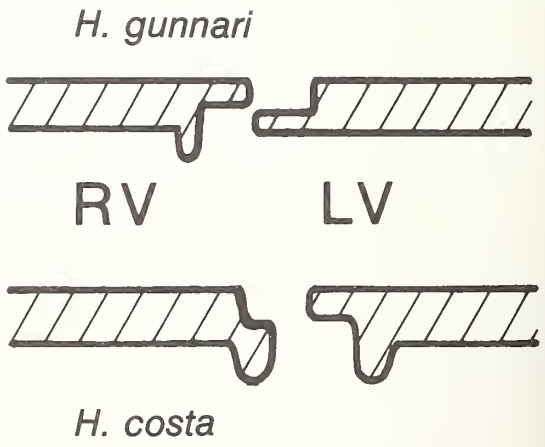
Explanation of Plate 12, 66

Figs. 1, 3, ♀ RV (**K 10025**, 1050μm long): fig. 1, int. vent., ant. detail of antrum and velum.; fig. 3, int. lat. showing antrum; fig. 2, ♀ RV, ext. ant. (**K 10026**, 1010μm long).

Scale A 100μm; ×140), fig. 1; scale B (200μm; ×86), fig. 2; scale C (200μm; ×65), fig. 3.



Text-fig. 1. Localities for *H. costa* (CN is the type locality).

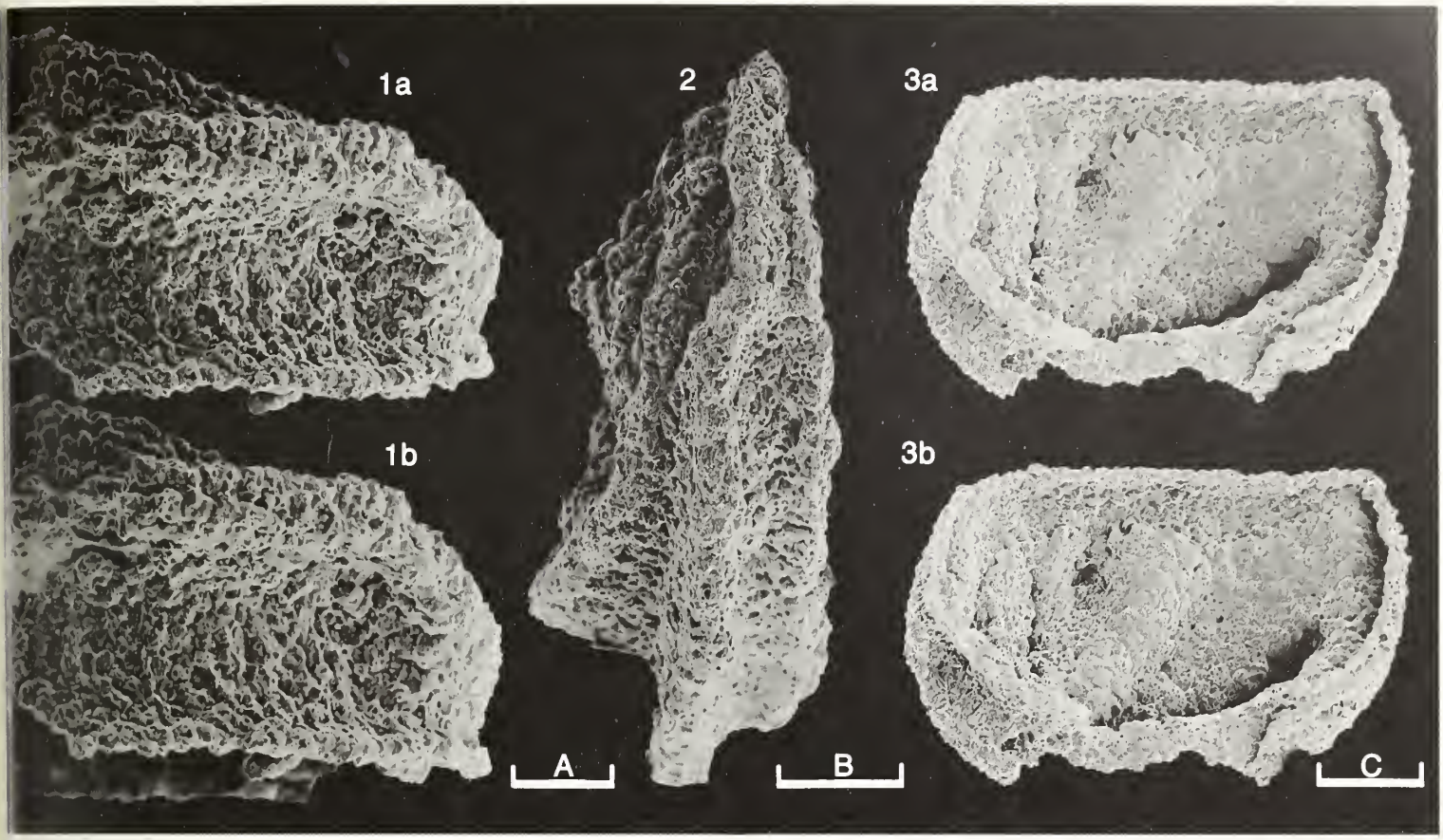


Text-fig. 2. Contact sculptures in *Henningsmoenia*.

Explanation of Plate 12, 68

Fig. 1, ♂ LV, int. lat. (**K 10027**, 1200μm long); fig. 2, tecnomorphic car., ext. vent. (**K 10032**, 960μm long); fig. 3, ♀ LV, ext. vent. detail of antrum and velar edge (**K 10033**, 1220μm long).

Scale A (200μm; ×60), fig. 1; scale B (200μm; ×60), fig. 2; scale C (100μm; ×140), fig. 3.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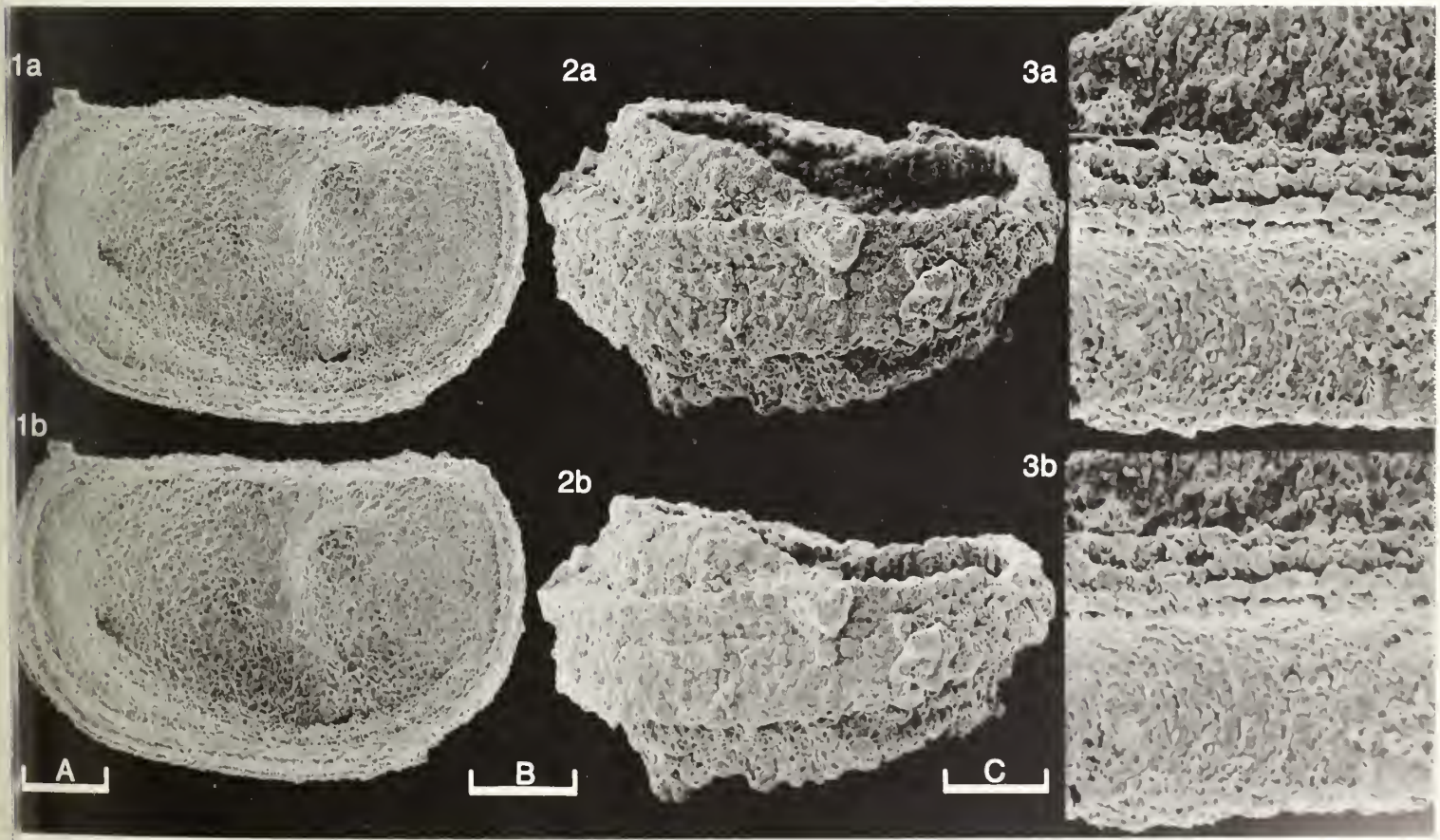
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595.337.14 (119.9) (262.2 : 161.022.38) : 551.313.1

ON *TYRRHENOCYTHERE AMNICOLA* (SARS)

by Timothy R. Maness & Roger L. Kaesler
(University of Kansas, Lawrence, Kansas, USA)

Genus *TYRRHENOCYTHERE* Ruggieri, 1955

Type-species (by original designation): *Tyrrhenocythere pignattii* Ruggieri, 1955 (= *Cythere amnicola* Sars, 1888)

1955 *Tyrrhenocythere* gen. nov. G. Ruggieri; *J. Paleont.*, **29** (4), 698.

Diagnosis: A genus of Hemicytheridea, subrectangular, subtrapezoidal, or auriform in lateral view. Eye tubercle distinct. Anterior vestibule partitioned into pockets; each pocket is the base of a fan-like bundle of radial pore canals. Muscle-scar pattern consists of a row of four adductor scars, dorsomedian scar divided, ventromedian scar usually divided; lone, sometimes divided, scar located dorsomedially; oblique row of three frontal scars anterior to adductors.

Remarks: The peculiar vestibule is the outstanding distinguishing feature of this genus. The appendages are typically hemicytherid and were well illustrated by Sars (1888).

Tyrrhenocythere amnicola (Sars, 1888)

1888 *Cythere amnicola* sp. nov. G. O. Sars, *Arch. Math. Naturv.*, **12**, 305–312, pl. 15, figs. 8–10, pl. 10.
1902 *Cythere sicula* sp. nov. G. S. Brady, *Trans. zool. Soc. Lond.*, **16**, pt. 4, 198, pl. 25, figs. 1–7.
1947 *Hemicythere sicula* (Brady); Z. S. Bronstein, *Fauna SSSR. Rakoobraznye 2*, 1. *Ostracoda presnykh vod.*, 293, text-figs. 194–197, Moskva. AN SSSR.
1955 *Tyrrhenocythere pignattii* sp. nov. G. Ruggieri, *J. Paleont.*, **29** (4), 698–699, text-figs. 1–5.
1977 *Tyrrhenocythere amnicola* (Sars); N. Krstić, *in* H. Löffler & D. Danielopol (eds.), *Aspects of Ecology and Zoogeography of Recent and Fossil Ostracoda*, 395–405, pl. 1, fig. 4, Junk, The Hague (q.v. for full synonymy).

Explanation of Plate 12, 70

Fig. 1, ♂ RV, ext. lat. (**1101251**, 1250 μm long); fig. 2, ♀ RV, ext. lat. (**1101253**, 1070 μm long); fig. 3, ♂ RV, int. lat. (**1101257**, 1330 μm long). Scale A (400 μm; ×48), figs. 1–3.

Type specimens: Uncertain; either Zoological Museum, Oslo, or lost. Ruggieri deposited a paratype (of *T. pignattii*), no. **OT-167**, with the Department of Micropaleontology, American Museum of Natural History, New York.

Type locality: The Cyane River near Siracusa, Sicily (approx. lat. 37°04′N, long. 15°17′E); Recent.

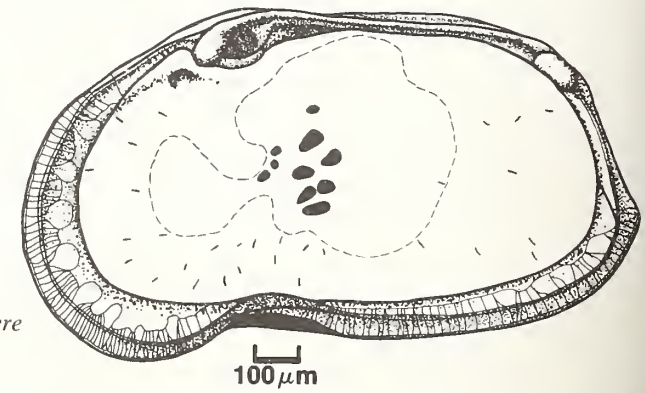
Figured specimens: Mus. of Invert. Paleo., Univ. of Kansas, USA, nos. **1101250** (♂ LV: Pl. **12**, 72, fig. 1), **1101251** (♂ RV: Pl. **12**, 70, fig. 1), **1101253** (♀ RV: Pl. **12**, 70, fig. 2), **1101256** (♂ LV: Pl. **12**, 72, fig. 3), **1101257** (♂ RV: Pl. **12**, 70, fig. 3), **1101269** (♀ LV: Pl. **12**, 72, fig. 2). All from the Gulf of Corinth, Greece, lat. 38°21′40″N, long. 22°25′35″E, water depth 73.2 m, from an 8.95 m long core taken by the Lamont-Doherty Geological Observatory.

Diagnosis: Surface, densely finely pitted; faint reticulation near free margin.

Remarks: Strongly dimorphic; males more elongate and laterally compressed; females more auriform.

We are grateful to Dr. N. Krstić for her taxonomic suggestions based on study of our specimens and to the American Museum of Natural History for lending us Ruggierri's paratype.

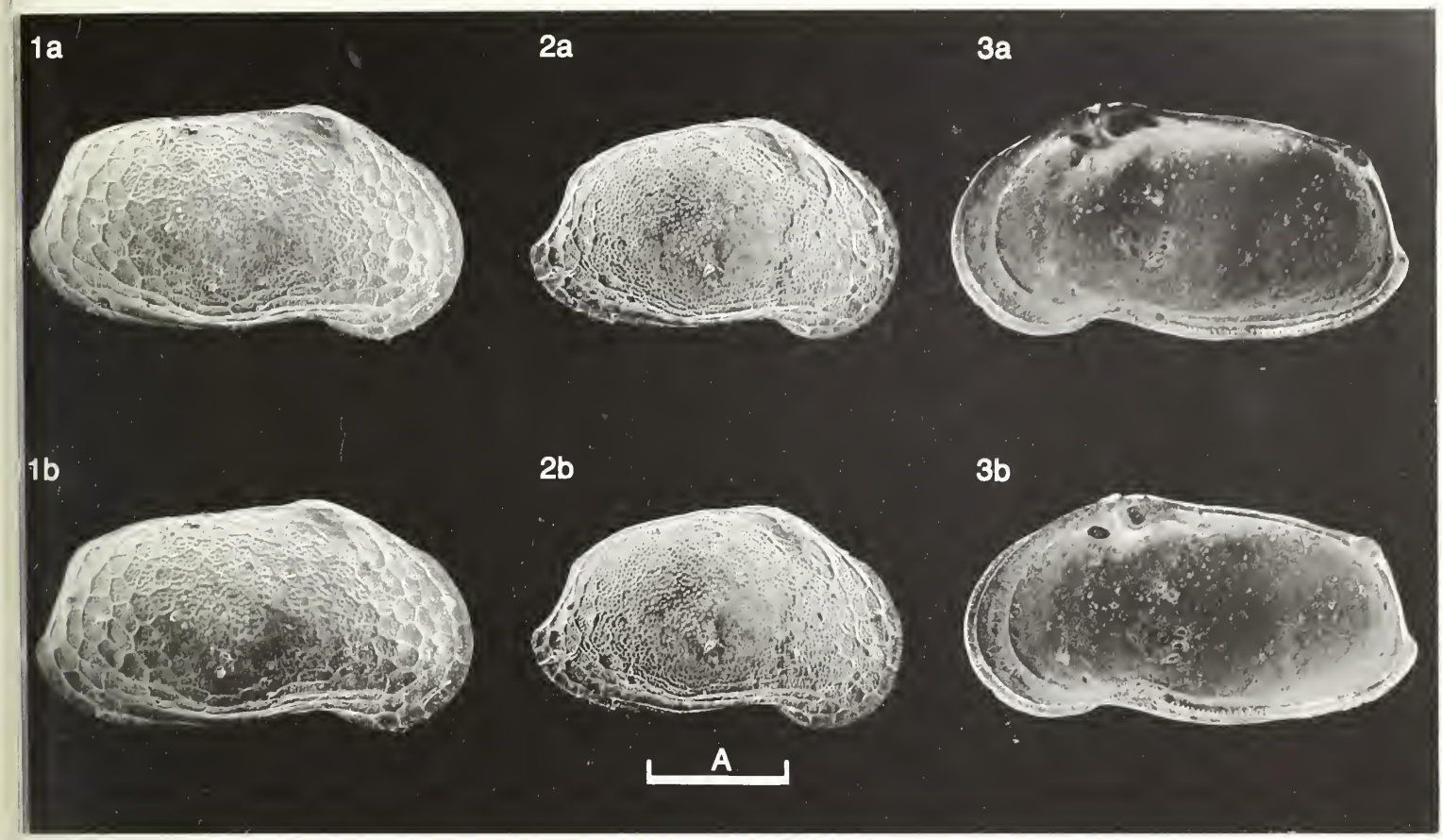
Distribution: Brackish-water deposits of the Mediterranean Region. Krstić (*op. cit.*) presents the following distribution: Recent: Caspian, Pontian, Ionian, and Tyrrhenian basins. Upper Pliocene-Pleistocene: Caspian Basin.



Text-fig. 1. Camera-lucida drawing of *Tyrrhenocythere amnicola*, ♂ RV, int. view.

Explanation of Plate 12, 72

Fig. 1, ♂ LV, ext. lat. (**1101250**, 1210 μm long); fig. 2, ♀ LV, ext. lat. (**1101269**, 1100 μm long); fig. 3, ♂ LV, int. lat. (**1101256**, 1310 μm long). Scale A (400 μm; ×48), figs. 1-3.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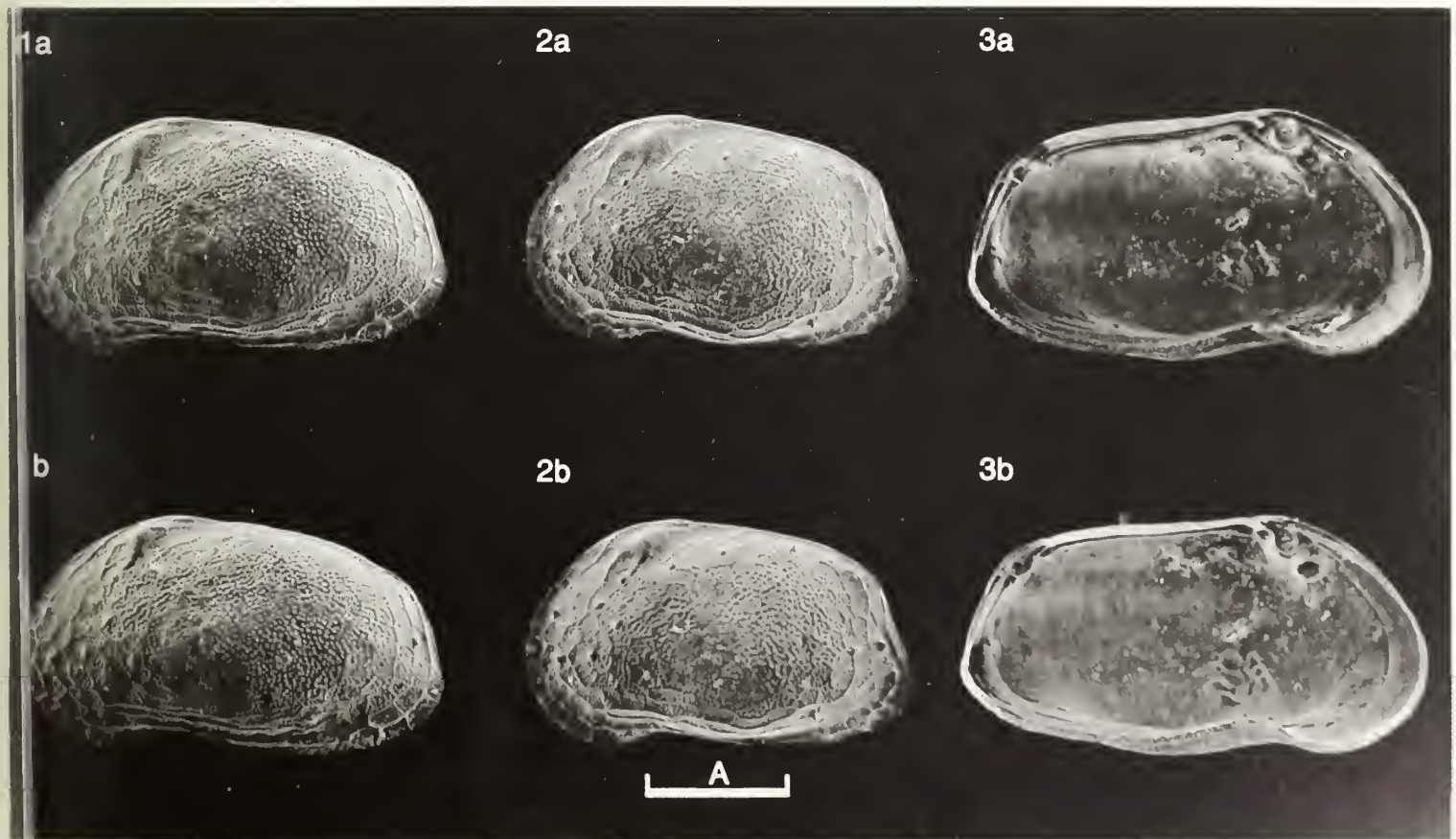
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595.337.14 (116.312) (427.4 : 162.001.54) : 551.351 + 552.52

ON *PARANOTACYTHERE (PARANOTACYTHERE) MAGNIFICA* LOMAX sp. nov.

by Allistair Lomax
(University of Hull, England)

Paranotacythere (Paranotachthere) magnifica sp. nov.

Holotype: University of Hull coll. no. **HU.307.C.1**; ♂ carapace.
[Paratypes: University of Hull nos. **HU.307.C.2, HU.307.C.3, HU.307.C.4.1-10**].

Type locality: Bed C9A of coastal section of Speeton Clay, Speeton, E Yorkshire, England; lat. 54° 10′N, long. 0° 14′ 40″W. Lower Hauterivian, lower Cretaceous.

Derivation of name: Latin *magnifica*, magnificent; in reference to its excellent ornamentation and preservation.

Figured specimens: University of Hull coll. nos. **HU.307.C.1.** (holotype, ♂ car.: Pl. **12**, 74, fig. 1; Pl. **12**, 76, fig. 2), **HU.307.C.2** (♀ LV: Pl. **12**, 74, fig. 2) and **HU.307.C.3** (♀ LV: Pl. **12**, 76, fig. 1). All specimens are from the type locality and horizon.

Diagnosis: A species of *Paranotacythere (Paranotacythere)* with strong reticulation, a large postero-dorsal tubercle and in which the uppermost blade-like ventral rib tends to end at the anterior of the two postero-ventral tubercles or only continues between them in much reduced fashion.

Explanation of Plate 12, 74

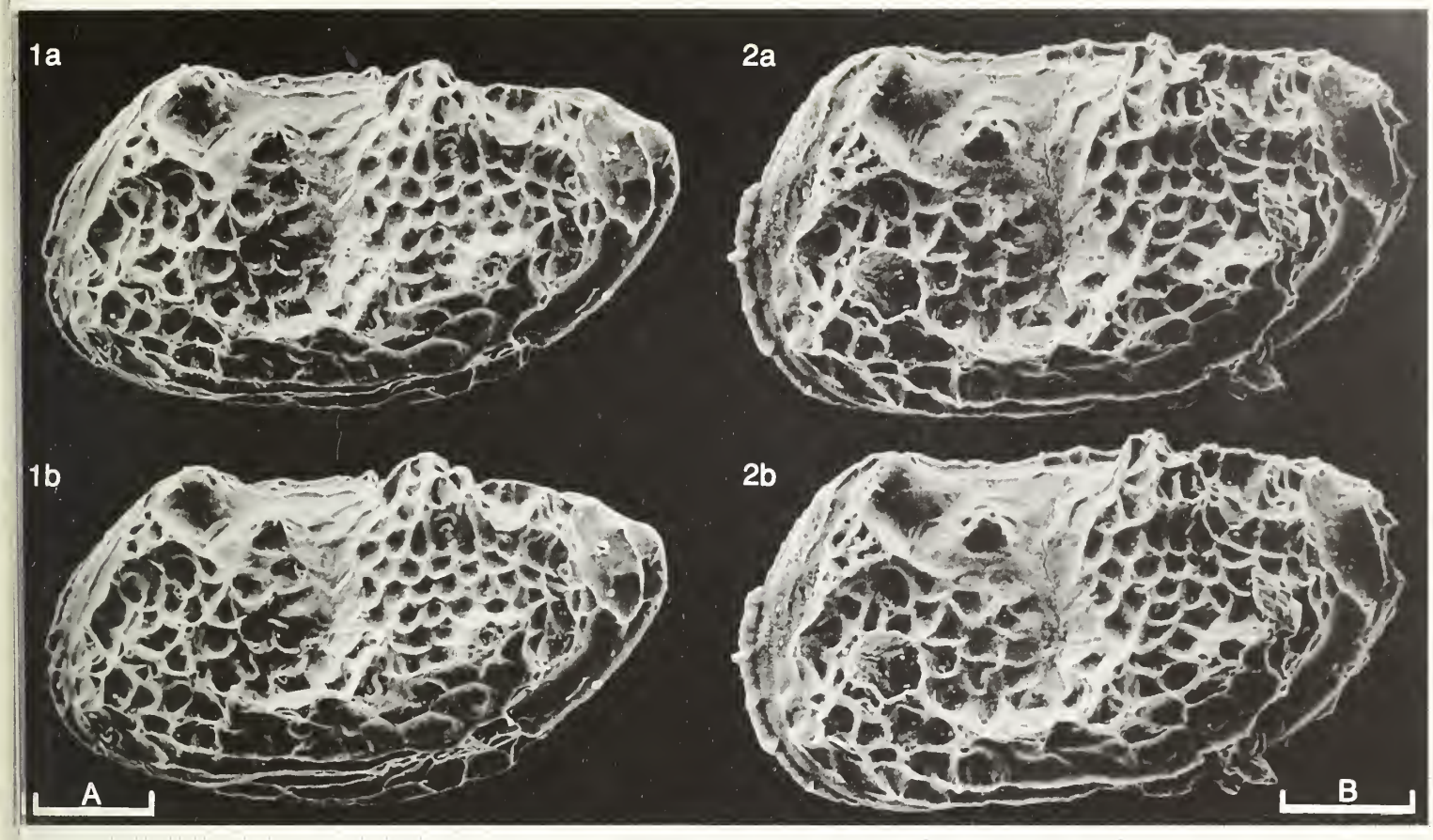
Fig. 1, ♂ car., ext. lt. lat. (holotype, **HU.307.C.1**, 560μm long); fig. 2, ♀ LV, ext. lat. (paratype, **HU.307.C.2**, 530μm long). Scale A (100μm; ×162), fig. 1; scale B (100μm; ×181), fig. 2.

Remarks: The lower Hauterivian *Paranotacythere (P.) magnifica* differs from the upper Hauterivian *P.costata* (Kaye) in the absence of thick and rounded ventral ribbing. *P.costata* also has a much less prominent dorsal tubercle and reduced reticulation compared with *P.magnifica*. *P. ramulosa* (Sharapova), which is first found in Bed C3, upper Hauterivian at Speeton, differs only in having two large tubercles in the anteroventral region which replace the uppermost ventral rib. This suggests that *P.ramulosa* is related to *P.magnifica* and is probably derived from it by loss of the ventral rib and addition of the two anteroventral tubercles.

Distribution: *P.(P.) magnifica* is rare and has so far only been obtained from Bed C9A in the Speeton Clay of the coastal section, E Yorkshire, England. Over two dozen specimens have been recovered. The lithology is a dark grey, sideritic clay and common ostracod associates include *Schuleridea punctatula* (Roemer), *Protocythere triplicata* (Roemer), *Protocythere hechti* Triebel and *Acrocythere hauteriviana* (Bartenstein).

Explanation of Plate 12, 76

Fig. 1, ♀ LV, int. lat. (paratype, **HU.307.C.3**, 610μm long); fig. 2, ♂ car., ext. dors. (holotype, **HU.307.C.1**, 560μm long). Scale A (100μm; ×159), fig. 1; scale B (100μm; ×175), fig. 2.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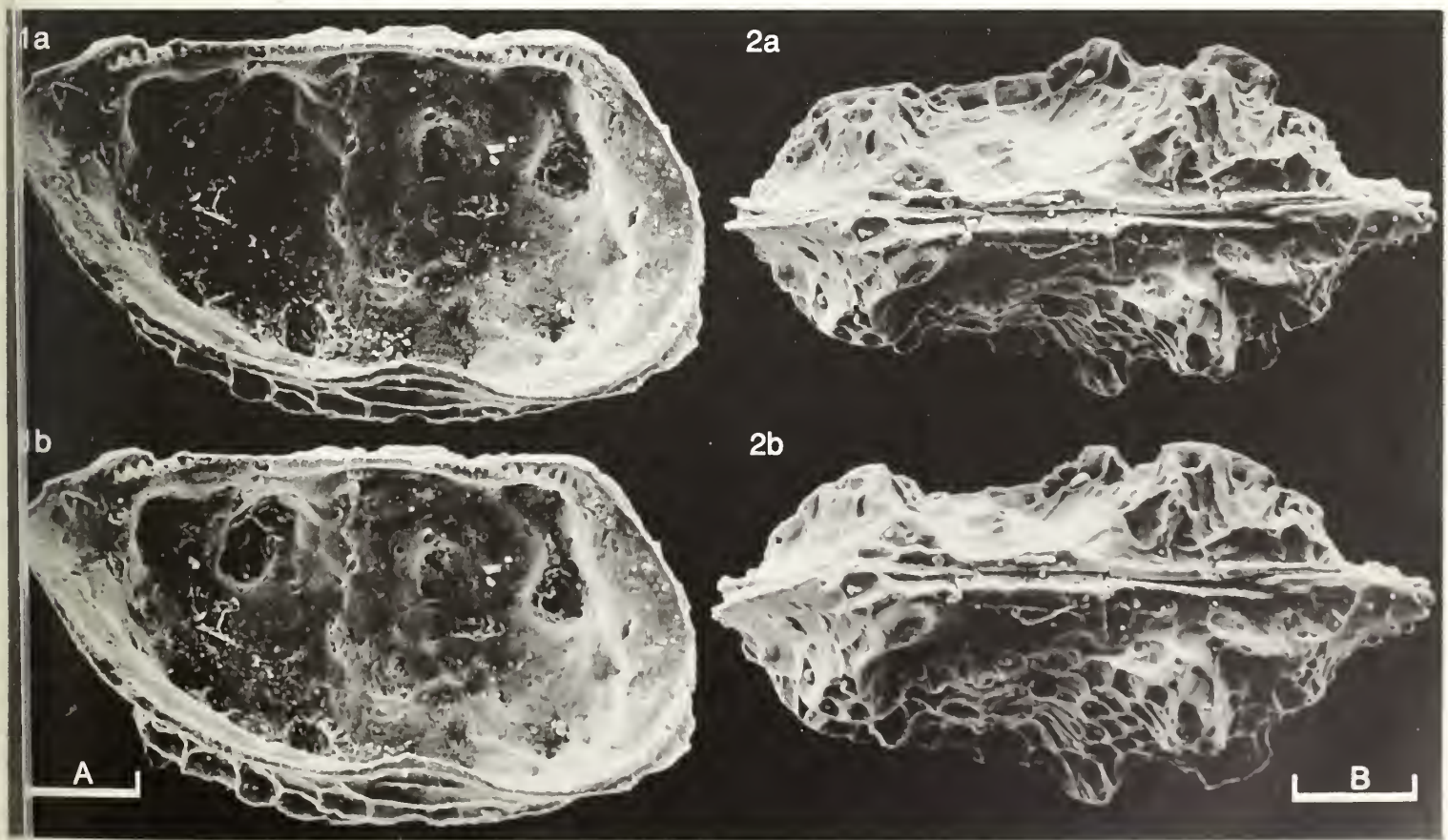
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edited by R. H. Bate, D. J. Horne, J. W. Neale,
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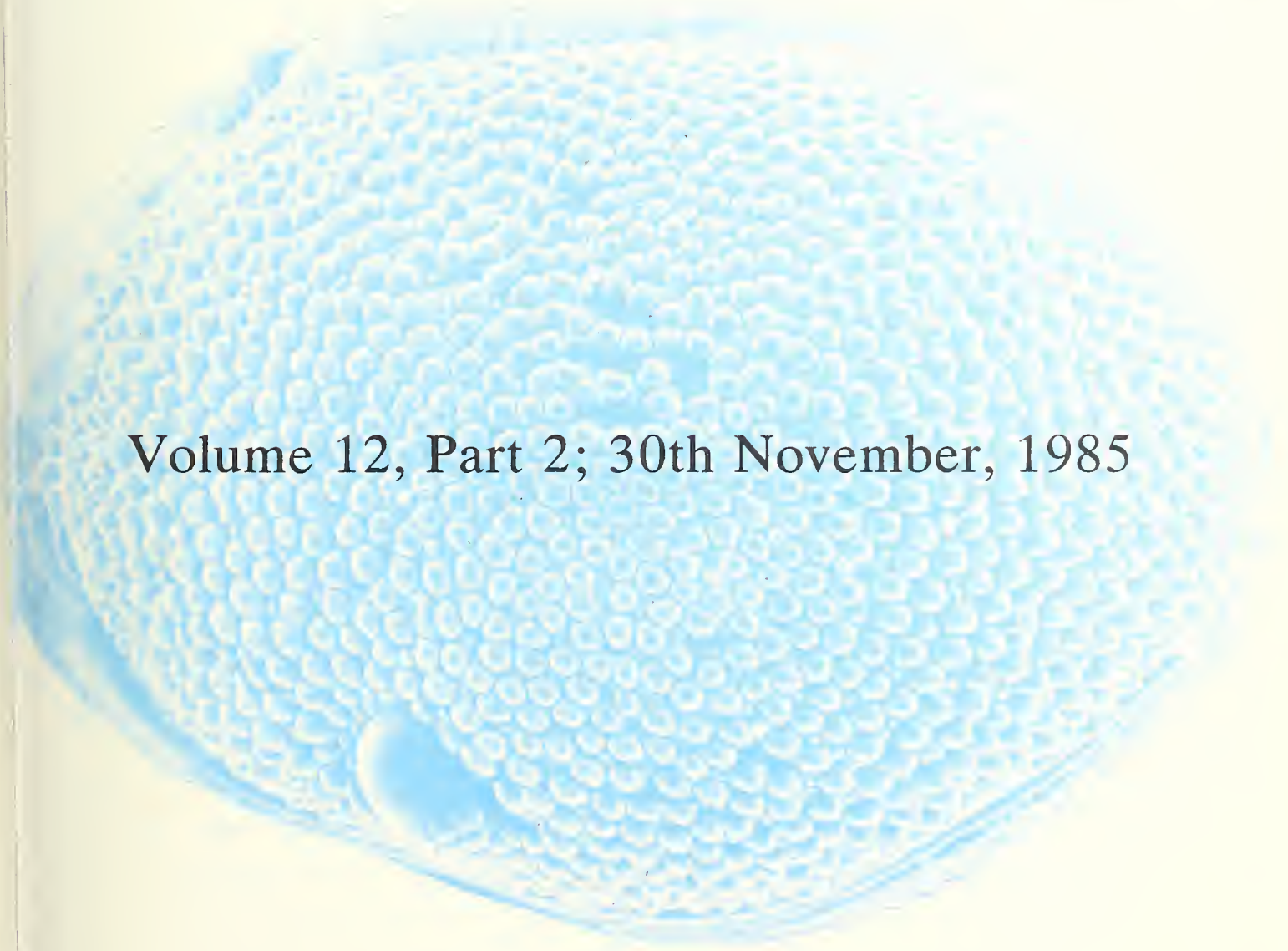

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Dr D.J. Horne, Department of Geology, City of London Polytechnic, Walburgh House, Bigland Street, London E1 2NG.
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Contributions illustrated by scanning electron micrographs of Ostracoda in stereo-pairs are invited. Format should follow the style set by the majority of papers in this issue. Descriptive matter apart from illustrations should be cut to a minimum; preferably each plate should be accompanied by one page of text only. Blanks to aid in mounting figures for plates may be obtained from any one of the Editors or Editorial Board. Completed papers should be sent to Dr David J. Siveter.

The front cover shows a right valve (927 μm long) of *Newnhamia petiola* De Deckker, 1979, in life position; from the type locality, Pine Tree Creek Lagoon, near Hughenden, Queensland, Australia. This species swims upside down and can stick to the water surface tension with its flat ventral area.

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ON *XYSTISTA AURICULARIS* (JONES)

by David J. Siveter
(University of Leicester, England)

Genus *XYSTISTA* gen. nov.

Type-species: *Bollia auricularis* Jones, 1887

Derivation of name: Latin *xystus*, covered gallery, & *ista*, agent; alluding to the antrum & torate velum. Feminine.

Diagnosis: Triemilomatellinae having two adventral spurs in small larvae, forming two dorsally connected flanges of unequal length in males. Female velum: even lateral outline, ridge-like anterodorsal margin to lobal area, terminates abruptly posteroventrally; 'thickened' by several ornamental ridges distally. Antrum dolonal to admarginal, non-loculate, from anterior to posteroventral regions. L1/L2 and L3/L4 = fused complexes; L3 weak or lacking. S2 distinct, sigmoidal.

Remarks: *Xystista* should be compared with *Australomatella* Schallreuter, 1974 (type-species: *Ctenentoma ? unguiculata* Öpik, 1953) and *Spinobolbina* Abushik, 1968 (type-species: *Spinobolbina bispina* Abushik, 1968), from the Llandovery of Australia and Siberia respectively. *A. unguiculata* (♂♂ only) is conspecific with the sympatric *C ? dubitabilis* Öpik, 1953 (♀♀ only); see Jaanusson 1957, *Bull. geol. Instn Univ. Uppsala*, **37**, 411. Öpik's specimens are destroyed and there is no other extant material (P. Jones, pers. comm.). Though poorly known, the triemilomatelline *Australomatella* (Schallreuter, *Rev. Espan. Micropal.*, **6**, 166, 1974) differs from *Xystista* in at least lacking a well developed antrum (cf. Öpik, *Mem. geol. Surv. Victoria.*, no. 19. pl. 12, fig. 122 & p. 34). *Spinobolbina* is illustrated (Abushik, *Novye vidy drevnich rasteny i bespozvonočnych SSR* **4** (2), pl. 58, figs. 9, 10, 1958) only by two tecnomorphic valves, both probably small larvae, and is unidentifiable with regard to the differences which have proved significant in triemilomatelline taxonomy; *S. bispina* is a *nomen dubium*.

Xystista occurs in Britain and the U.S.A. (*X. graffhami*, *Stereo-Atlas*, **12**, 81, 1985). May be derived from stock ancestral to the Ordovician holliniine *Grammolomatella* Jaanusson, 1957, which differs in S2 morphology

Explanation of Plate 12, 78

Fig. 1, ♀ RV, ext. lat. (**OS 12268**, 1325μm long); figs. 2-4, ♂ LV (**OS 12266**, 1200μm long): fig. 2, ext. post., fig 3, ext. lat.; fig. 4, ext. vent.; fig. 5, ♀ LV, ext. vent. obl. (**OS 12570**, 1050μm long).
Scale A (200μm; ×43), fig. 1; scale B (200μm; ×46), figs. 2-4; scale C (200μm; ×52), fig. 5.

Remarks (contd.): (dorsally), in having a much shorter female velum and males with two unconnected velar spurs and possibly in antral morphology.

Xystista auricularis (Jones, 1887)

1887 *Bollia auricularis*, sp. nov. T. R. Jones, *Ann. Mag. nat. Hist.*, (5) **19**, 408, pl. 13, figs. 10a-c.
1888 *Bollia auricularis* Jones; G. R. Vine, *Proc. Yorks. geol. & polytech. Soc.*, **9** (3), 399.
1891 *B ollia (?) auriclaris*, J.; E. O. Ulrich, *Jl. Cincin. Soc. nat. Hist.*, **13**, 185.
1892 *B ollia auricularis*, Jones; J. Smith, *Trans. nat. Hist. Soc. Glasg.*, **3**, 145 & table.
non 1901 *B ollia auricularis*, Jones; F. Chapman, *Ann. Mag. nat. Hist.*, (7), **7**, 150 (= *T.prisca* Jaanusson & Martinsson, 1956).
1908 *Ctenobolbina auricularis* (Jones); E. O. Ulrich & R. S. Bassler, *Proc. U.S. natn. Mus.*, **35**, 311, pl. 40, figs. 25-27.
1934 *Ctenobolbina auricularis* (Jones); R. S. Bassler & B. Kellett, *Spec. Pap. geol. Soc. Am.*, **1**, 68, 249 (*pars*), *non* 67.
non 1953 *Parabolbina auricularis* (Jones, 1887); G. Henningsmoen, *Norsk geol. Tidsskr.*, **31**, 240, pl. 1, figs. 5-8 (= *T. prisca* J & M)
1956 *Triemilomatella auricularis* (Jones, 1887); V. Jaanusson & A. Martinsson, *Bull. geol. Instn Univ. Uppsala*, **37**, 403, 407.
1984 *'Australomatella' auricularis* (Jones, 1887); D. J. Siveter, *Spec. Pap. Palaeontology*, **32**, 76, pl. 1, figs. 7-9.

Holotype: British Mus. (Nat. Hist.) no. **I2376**; ♀ carapace, no. 26 of Smith (see 1892). Type by monotypy.

Type locality: "Railway cutting, side of (River) Severn below Benthall Edge, Ironbridge" (Smith 1892, 145); = *c.* 800 m W of Ironbridge, Shropshire, England. Coalbrookdale Fm., Wenlock Series, Silurian.

Figured specimens: British Museum (Nat. Hist.) nos. **I 2376** (holotype, ♀ car.: Pl. **12**, 80, fig. 1), **OS 12266** (♂ LV: Pl. **12**, 78, figs. 2-4), **OS 12268** (♀ RV: Pl. **12**, 78, fig. 1), **OS 12570** (♀ LV: Pl. **12**, 78, fig. 5), **OS 12571** (♀ RV: Pl. **12**, 80, figs. 2-4), **OS 12572** (tecnomorphic car.: Pl. **12**, 80, fig. 5). Coalbrookdale Fm. at type locality and locs. 20 (**OS 12266**, **OS 12268**, **OS 12571**, **OS 12572**) and 48b (**OS 12570**) of Siveter 1980 (*Palaeontogr. Soc. Monogr.*, **133**, no. 556).

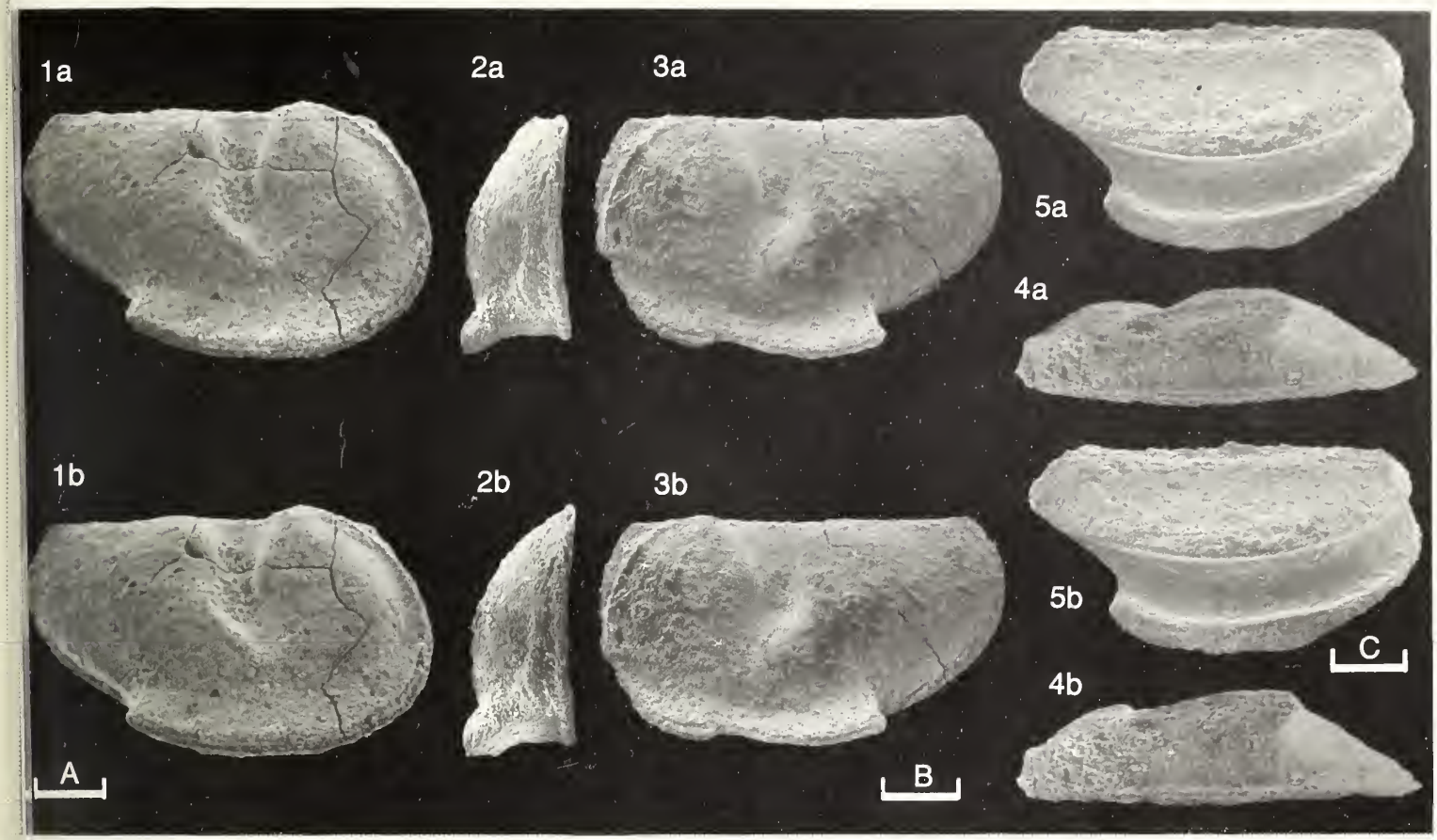
Diagnosis: Smooth *Xystista*. Dimorphs have 2 fine lateral ridges adjacent and parallel to velar edge and 2 similar toric ridges. S2 weak ventrally; anterior and posterior lobal complexes weakly connected. L3 redundant.

Remarks: *X. auricularis* differs from *X. graffhami* by its less concave antrum, its redundant L3 & ventrally less well developed S2, the number & spacing of lateral & toric ridges distally on the velum, & by its apparent lack of ornament.

Distribution: Known only from the Welsh Borderland, at the type locality and locs. 20, 48b, and 48c of Siveter 1980; all upper part of the Coalbrookdale Fm., Homerian Stage, Wenlock Series, Silurian.

Explanation of Plate 12, 80

Fig. 1, ♀ car., RV lat. (holotype, **I 2376**, 1375μm long); figs. 2-4, ♀ RV (**OS 12571**, 1300μm long): fig. 2, ext. ant.; fig. 3, ext. lat.: fig. 4, ext. vent.; fig. 5, tecnomorphic RV, ext. lat. (**OS 12572**, 925μm long).
Scale A (200μm; ×43), fig. 1; scale B (200μm; ×43), figs. 2-4; scale C (200μm; ×55), fig. 5.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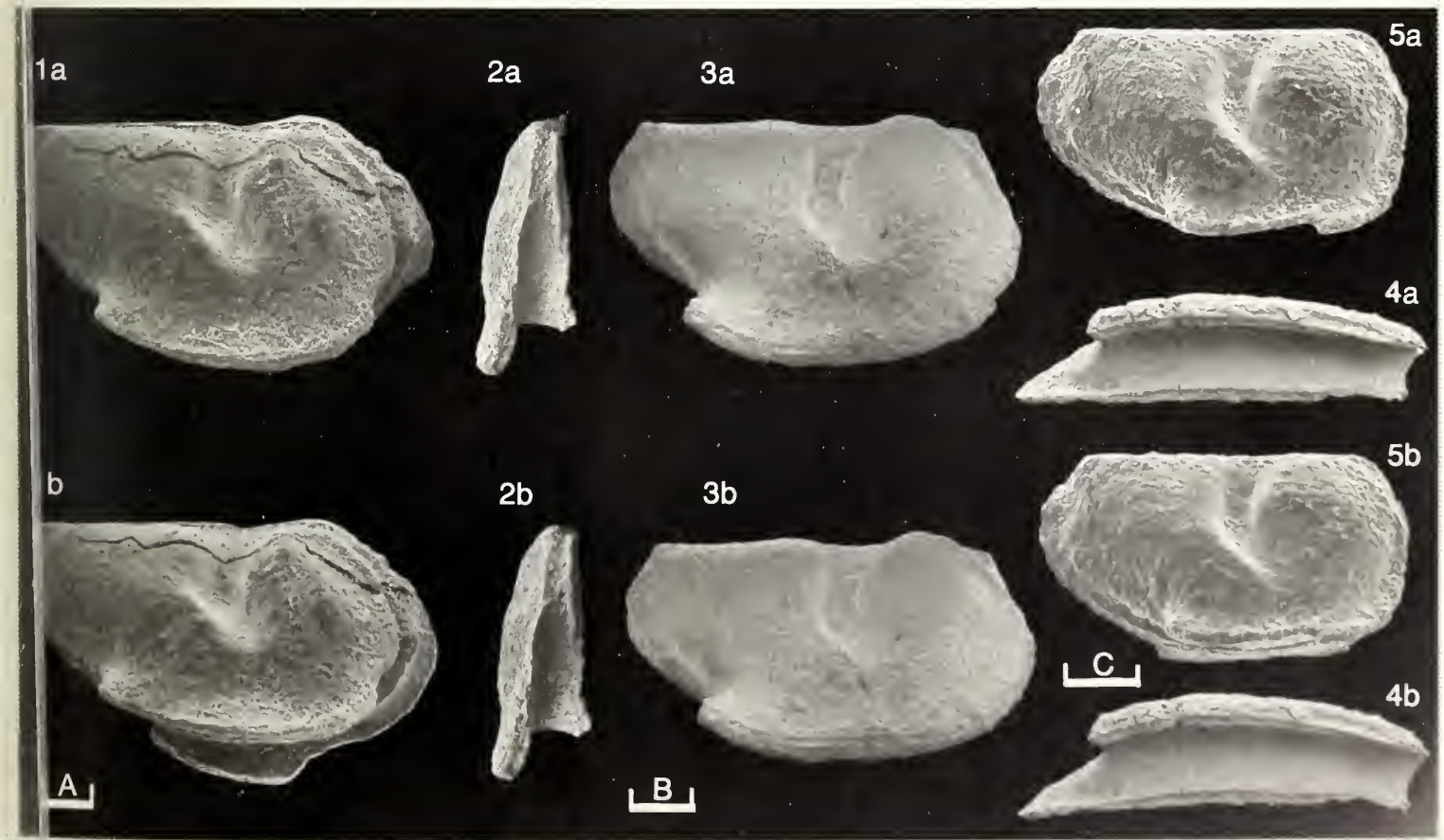
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ON *XYSTISTA GRAFFHAMI* (LUNDIN)

by Robert F. Lundin & David J. Siveter
(Arizona State University, Tempe, U.S.A. & University of Leicester, England)

Xystista graffhami (Lundin, 1965)

1965 *Grammolomatella graffhami* sp. nov.; R. F. Lundin, *Bull. Okla. geol. Surv.*, **108**, 33, pl. 7, figs. 2a-l, text-figs. 14a-c.
1974 *Australomatella graffhami* (Lundin, 1965); R. E. L. Schallreuter, *Rev. Espan. Micropaleo.*, **6**, 166.
1980 *Gramolomatella graffhami* Lundin, 1965; G. Qvale, *Norsk geol. Tidsskr.*, **60**, 107.
1981 *Australomatella graffhaimi* (Lundin) (*sic*); V. A. Ivanova, *Paleont. Zh.*, **15**(4), 14.

Holotype: Museum of Invertebrate Paleontology, University of Oklahoma (OU), no. 5100; ♀ LV.

Type locality: Section 'P18' of Lundin (1965, 16), East of Bois d'Arc Creek, Pontotoc County, Oklahoma, U.S.A.; 90ft below the top of the Henryhouse Formation, probable Ludlow Series, Silurian.

Diagnosis: Finely reticulo – granulose species of *Xystista* with females having one lateral velar ridge almost at and parallel to velar edge, closely beneath which are two toric ridges, the nearest being separated from the edge itself by a relatively wide, concave, shelf-like distal part of the velum which throughout has a transverse chevron pattern of fine ridges. Antrum strongly concave with prominent inner antral ridge (= 'fence'). L3 weakly developed; S2 extends from dorsum to velum.

Figured specimens: Museum of Invertebrate Paleontology, University of Oklahoma (OU), nos. **5100** (holotype, ♀ LV: Pl. **12**, 84, fig. 1), **5251c** (♂ LV: Pl. **12**, 82, figs. 4, 5; Pl. **12**, 84, fig. 3), **5251f** (tecnomorphic LV: Pl. **12**, 84, fig. 5), **5251h** (tecnomorphic LV: Pl. **12**, 84, figs. 7, 8), **10453** (♀ RV: Pl. **12**, 82, figs. 1-3; Pl. **12**, 84, figs. 4, 6), **10454** (♀ LV: Pl. **12**, 84, fig. 2). All from the type locality and horizon.

Explanation of Plate 12, 82

Figs. 1-3, ♀ RV (**OU 10453**, 1375 μm long): fig. 1, ext. ant.; fig. 2, ext. lat.; fig. 3, int. vent. obl. Figs. 4, 5, ♂ LV (**OU 5251c**, 1250 μm long): fig. 4, ext. vent.; fig. 5, ext. lat.
Scale A (200 μm; × 40), figs. 1-3; scale B (200 μm; × 43), figs. 4, 5.

Remarks: The Ordovician Scandinavian *Grammolomatella* differs in that its males have two unconnected velar spurs; its S2 is narrower and less well developed than in *Xystista*; and its female velum is much shorter (Jaanusson, *Bull. geol. Instn Univ. Uppsala*, **37**, 411, pl. 12, figs. 23-25, text-fig. 45).

X. graffhami differs from the British Wenlock type-species, *X. auricularis* Jones, 1887 (see Siveter, *Stereo-Atlas of Ostracod Shells*, **12**, 77-80, 1985), by its more concave antrum and slightly better developed L3, by the number and spacing of lateral and toric ridges distally on the velum and in having lobal ornament. The more pronounced antrum and lobes in *X. graffhami* are, phylogenetically, what might be expected from its slightly younger age. This congeneric ostracode link between Britain and Oklahoma, across the remnant Iapetus Ocean, is untypical. The Silurian ostracodes of Oklahoma are part of a non-palaeocope dominated 'mid-continent' province of North America, in which palaeocope ostracodes, though in some instances diverse, are not common elements of the fauna (Lundin, *Bull. Cent. Rech. Pau-SNPA*, **5**, 853-868, 1971). This contrasts with the 'European' province of southern Britain and Baltoscandia in which palaeocopes are very diverse and abundant.

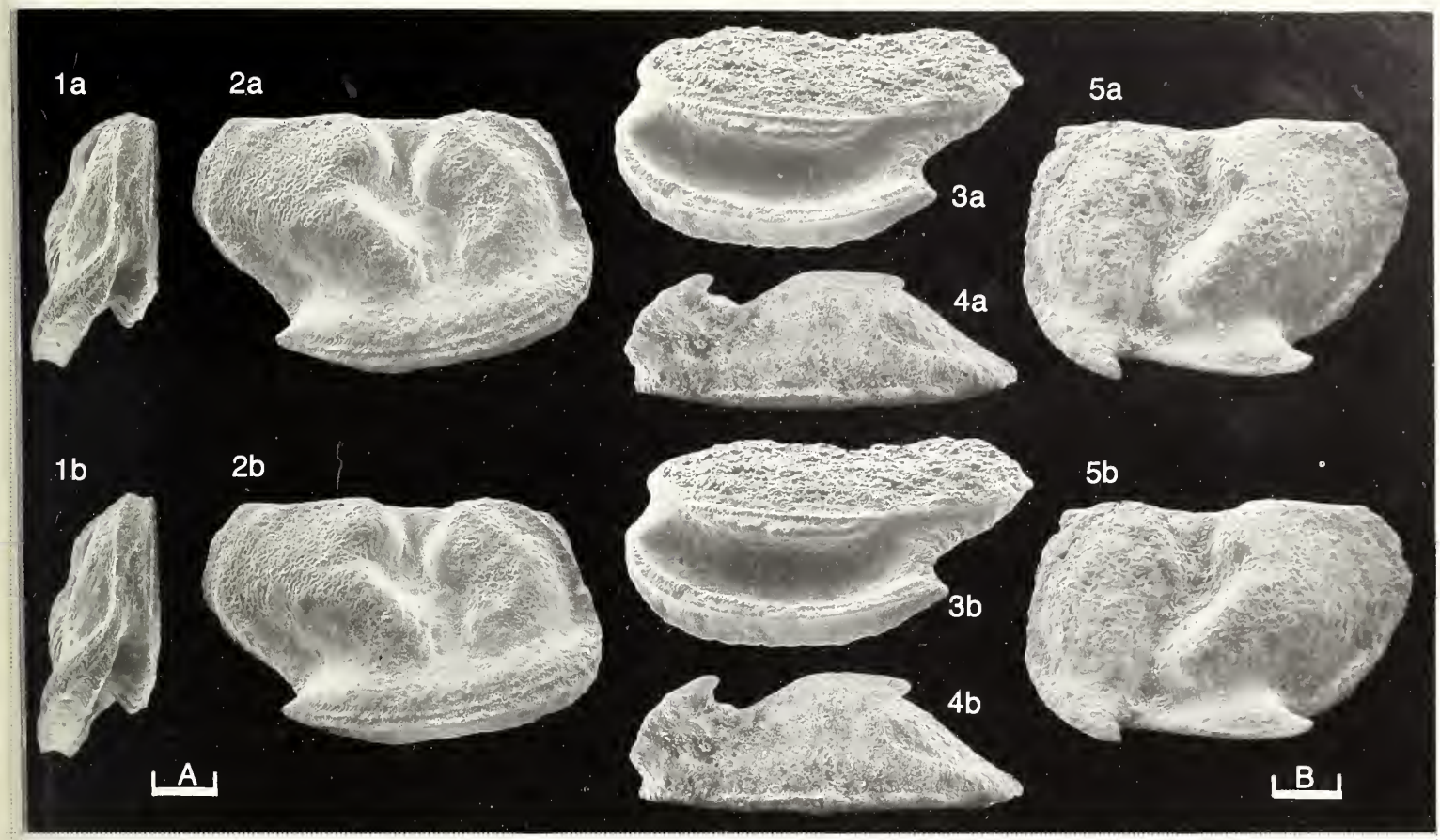
Tecnomorphs of *X. graffhami* have at least the lateral ornamental ridge and a toric ridge distally on the velum; although possibly a preservational factor, the existence of a second toric ridge (as in females) is unconfirmed. Females have a further dimorphic structure: a stout, curved, lip-like admarginal ridge, present only adjacent to the antrum and surmounted adventrally by the marginal ridge which itself is entire between cardinal corners (Pl. **12**, 82, fig. 3). This type of inner antral fence is lacking in the type-species. The pattern of very fine ridges laterally and ventrally along the female velar edge of *X. graffhami* also occurs in tecnomorphs.

Distribution: Known from two localities (P18-1, Ca1-8 of Lundin, 1965) in the Henryhouse Fm., Ludlow Series, Silurian, of Oklahoma. A closely related, but poorly known form of the genus has been found in the basal Brownsport Fm., Ludlow Series, of western Tennessee.

Acknowledgment: D.J.S. gratefully acknowledges support from the University of Leicester and the Royal Society.

Explanation of Plate 12, 84

Fig. 1, ♀ LV, ext. lat. (holotype, **OU 5100**, 1340 μm long); fig. 2, ♀ LV, ext. ant. (**OU 10454**, 1310 μm long); fig. 3 ♂ LV, ext. ant. (**OU 5251c**); fig. 4, ♀ RV, ant. detail of velar edge (**OU 10453**); fig. 5, tecnomorphic LV, ext. lat. (**OU 5251f**, 1120 μm long); fig. 6, ♀ RV, ornament on L3 (**OU 10453**). Figs. 7, 8, tecnomorphic LV, ext. lat. (**OU 5251h**, 960 μm long): fig. 7, ext. lat.; fig. 8, ext. vent.
Scale A (200 μm; × 42), figs. 1-3, 5; scale B (100 μm; × 100), fig. 4; scale C (100 μm; × 135), fig. 6; scale D (200 μm; × 47), figs. 7, 8.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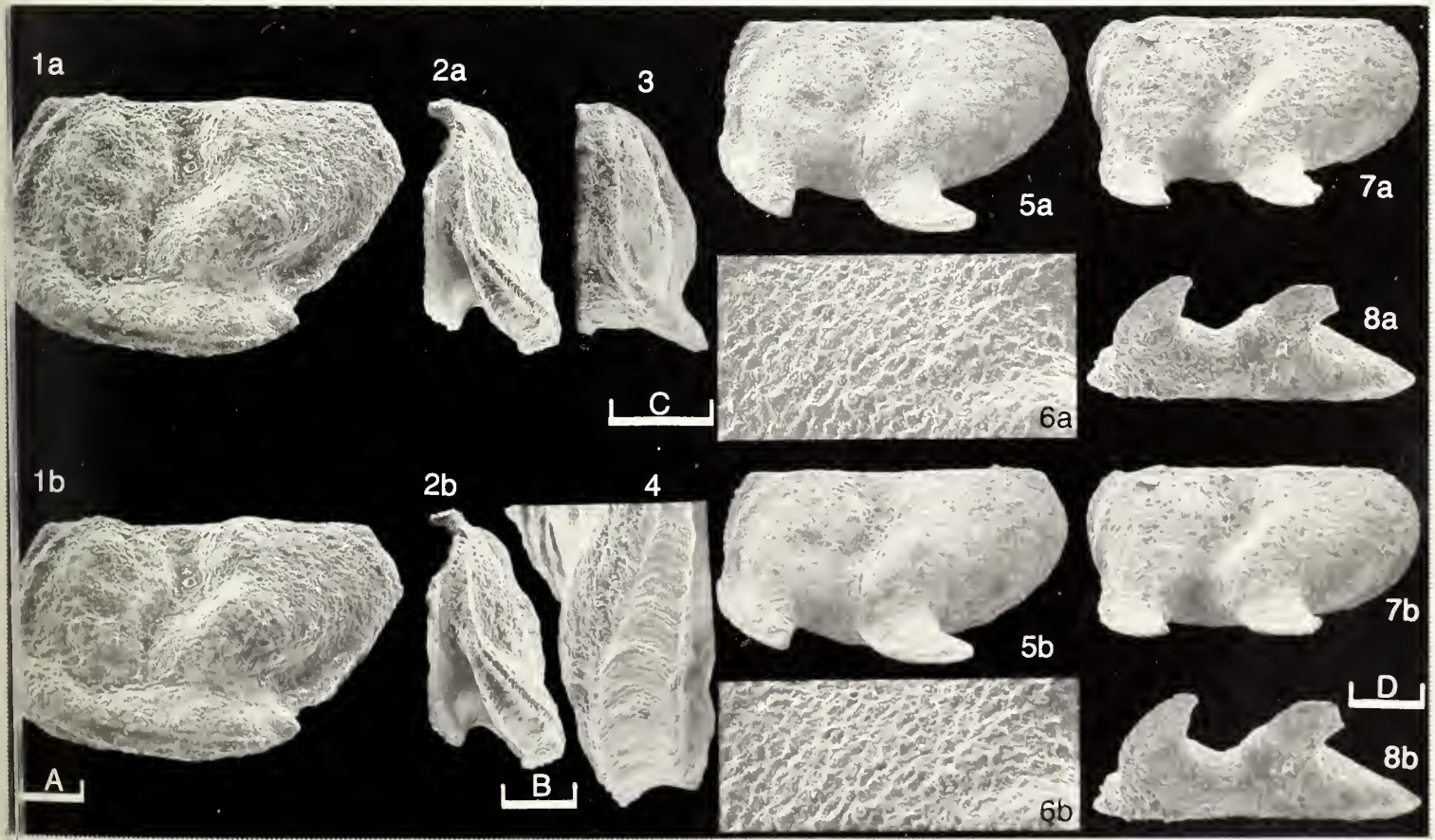
1a
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C
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D
8b
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B

595.336.11 (113.331) (481 : 161.010.59) : 551.35 + 552.54

ON *SLEPENDIA ARMATA* (HENNINGSMOEN)

by Paul D. Pollicott & David J. Siveter
(University of Leicester, England)

Genus *SLEPENDIA* Martinsson, 1962

Type-species (by original designation) : *Craspedobolbina armata* Henningsmoen, 1954

Diagnosis: Reticulo-striate and tuberculate Beyrichiinae (?) with elongate, anteroventral crumina well assimilated with anterior lobal complex; intervening depression lacking. Crumina with coarse, ventral striae. Velum narrow, flange like, extending between cardinal corners, restricted posteroventrally in tecnomorphs; interrupted by crumina in females. Velar restriction identified in females by position of posterior spine on crumina. Syllobium and anterior lobe each with a low plica. Zygal arch almost obsolete in tecnomorphs and assimilated in crumina. Prenodel sulcus virtually lacking; adductorial sulcus prominent.

Remarks: *Slependia* is closest to the Baltoscandian beyrichiine *Bingeria* Martinsson, 1962, but differs particularly in having a more assimilated crumina and a tecnomorphic velar restriction and a corresponding cruminal spine.

The subfamilial assignment of *Slependia* is equivocal. Kesling & Rogers (*op. cit.*, 1000) tentatively regarded the genus as a kloedeniid, but Martinsson (*op. cit.*, 262) considered it to possibly have a subcruminal dolonoid plication characteristic of zygobolbine beyrichiacians. The subcruminal morphology has been prepared (with great difficulty) in two of our females and shows that no such plication exists; the specimens have a cruminal morphology, lobation and ornament reminiscent of the beyrichiine-like *Bingeria* (see Pl. **12**, 86, figs. 1-4).

Explanation of Plate 12, 86

Fig. 1, ♀ RV, ext. lat. (**PMO 113.162**, 1.68 mm long). Figs. 2, 3, ♀ RV (**PMO 113.163**, 1.60 mm long): fig. 2, ext. vent. obl.; fig. 3, ext. vent.
Fig. 4, ♂ LV, ext. lat. (**PMO 113.164**, 1.56 mm long).
Scale A (270 μm; ×37), figs. 1-3; scale B (250 μm; ×39), fig. 4.

Remarks (contd.): *Slependkia* and *Bingeria* are rare European representatives of a group of atypical beyrichiine genera best known from North America e.g. *Lophokloedenia* and *Welleriopsis* (both Swartz & Whitmore 1956, *J. Paleont.*, **30**). It is likely that these unrevised genera form the basis of a distinct, yet hitherto undescribed beyrichiid subfamily (Martinsson 1962). Both *Slependia* and *Bingeria* differ from typical beyrichiinae in having reticulo-striations rather than granulation/tuberculation as their ground pattern ornament, although even in *Slependia* in places the individual striae consist largely of single lines of granules (see Pl. **12**, 88, fig. 4).

Slependia armata (Henningsmoen, 1954)

1954 *Craspedobolbina armata* sp. n. G. Henningsmoen, *Norsk. geol. Tidsskr.*, **34**, 47, pl. 4, figs. 1-4, pl. 8, figs. 10, 11.
1957 *Craspedobolbina armata* Henningsmoen, 1954; R. V. Kesling & K. J. Rogers, *J. Paleont.*, **31**, 1000, pl. 129, figs. 1-7.
1957 *Craspedobolbina armata* Henningsmoen; R. V. Kesling, *Contr. Mus. Paleont. Univ. Mich.*, **14**, 64, pl. 6, figs. 1-3.
non 1962 *Craspedobolbina* cf. *armata* Henningsmoen; L. Sarv, *Eesti NSV Tead. Akad. Geol. Inst. Uurim.*, **9**, 125, pl. 7, figs. 10-13.
1962 *Slependia armata* (Henningsmoen); A. Martinsson, *Bull. geol. Instn Univ. Uppsala.*, **41**, 262.
1970 *Slependia armata* (Henningsmoen); M. J. Copeland, *Bull. geol. Surv. Can.*, **187**, 4.
1982 *Splendia armata* (Henningsmoen, 1954) (*sic*); D. J. Siveter *in:* D. Worsley (Ed.), *Paleo. Contr. Univ. Oslo.*, **278**, 123, pl. 1, figs. 1, 2.

Holotype: Paleontologisk Museum, Oslo, **PMO 52974a**; ♀ RV.

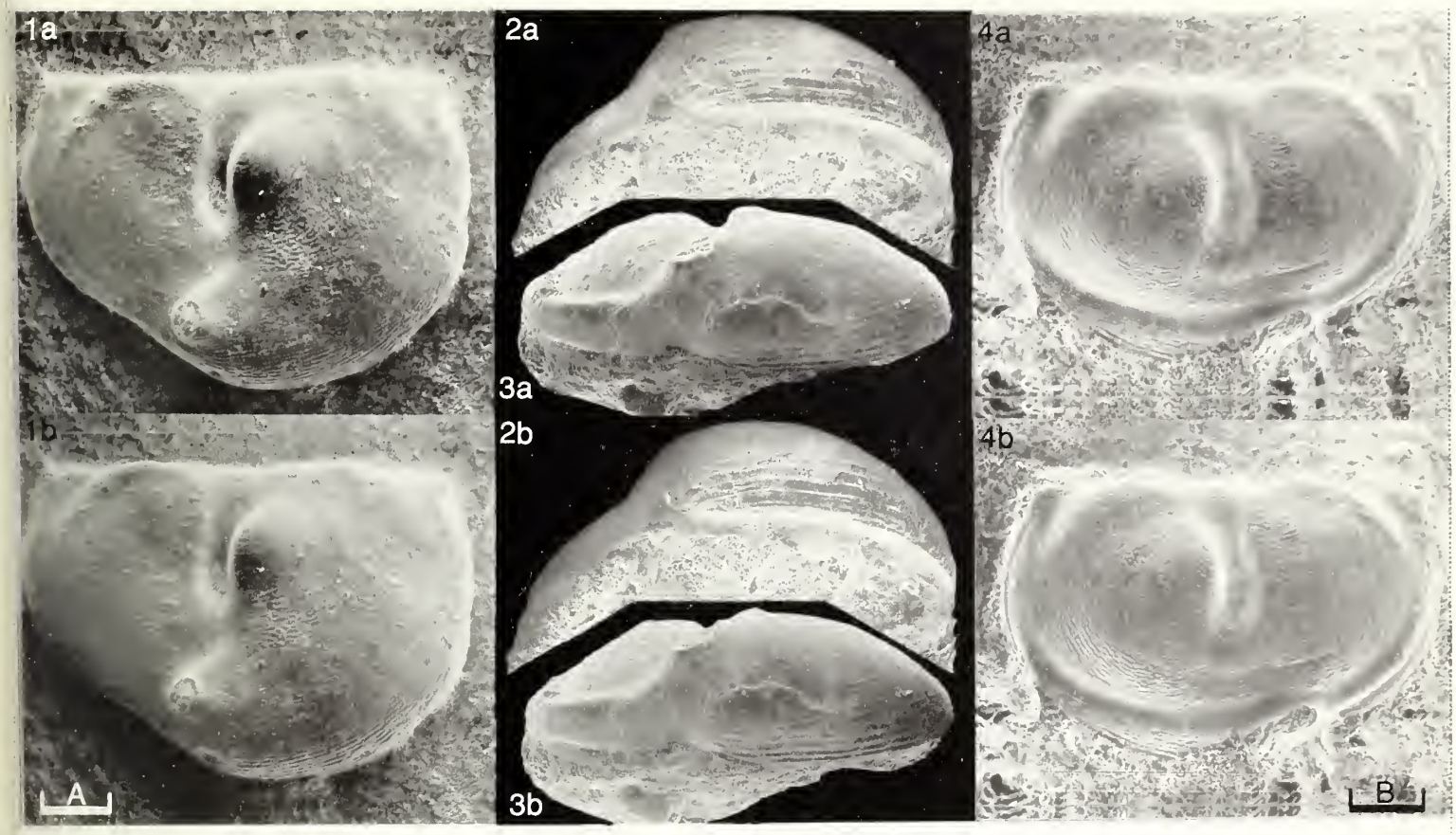
Type locality: Slependen, Asker district, Oslo region, Norway; approx. lat. 59° 54′N, long. 10° 29′E (see Text-fig. 1). Upper Solvik Formation, Etage 6cβ;Silurian (see Worsley 1982, *op. cit.*).

Figured specimens: Paleontologisk Museum, Oslo, nos. **PMO 113.162** (♀ RV: Pl. **12**, 86, fig. 1), **PMO 113.163** (♀ RV: Pl. **12**, 86, figs. 2, 3), **PMO 113.164** (♂ LV: Pl. **12**, 86, fig. 4), **PMO 113.165** (♂ RV: Pl. **12**, 88, figs. 1-4), **PMO 113.166** (♂ RV: Pl. **12**, 90, figs. 1, 2), **PMO 113.167** (♀ RV: Pl. **12**, 90, fig. 3), **PMO 113.168** (♂ LV: Pl. **12**, 92, fig. 1), **PMO 113.169** (♀ LV: Pl. **12**, 92, figs. 2, 3). All figured specimens from the type section and horizon, Solhaugvn, Slependen (see Text-fig. 1).

Diagnosis: As for the genus. *Slependia* is currently monotypic.

Explanation of Plate 12, 88

Figs. 1-4. ♂ RV (**PMO 113.165**, 1.61 mm long): fig. 1, ext. lat.; fig. 2, vent. obl.; fig. 3, lat. velar ornament; fig. 4, reticulo-striation on ant. lobe.
Scale A (270 μm; ×37), fig. 1; scale B (290 μm; ×35), fig. 2; scale C (40 μm; ×248), fig. 3; scale D (15 μm; ×670), fig. 4.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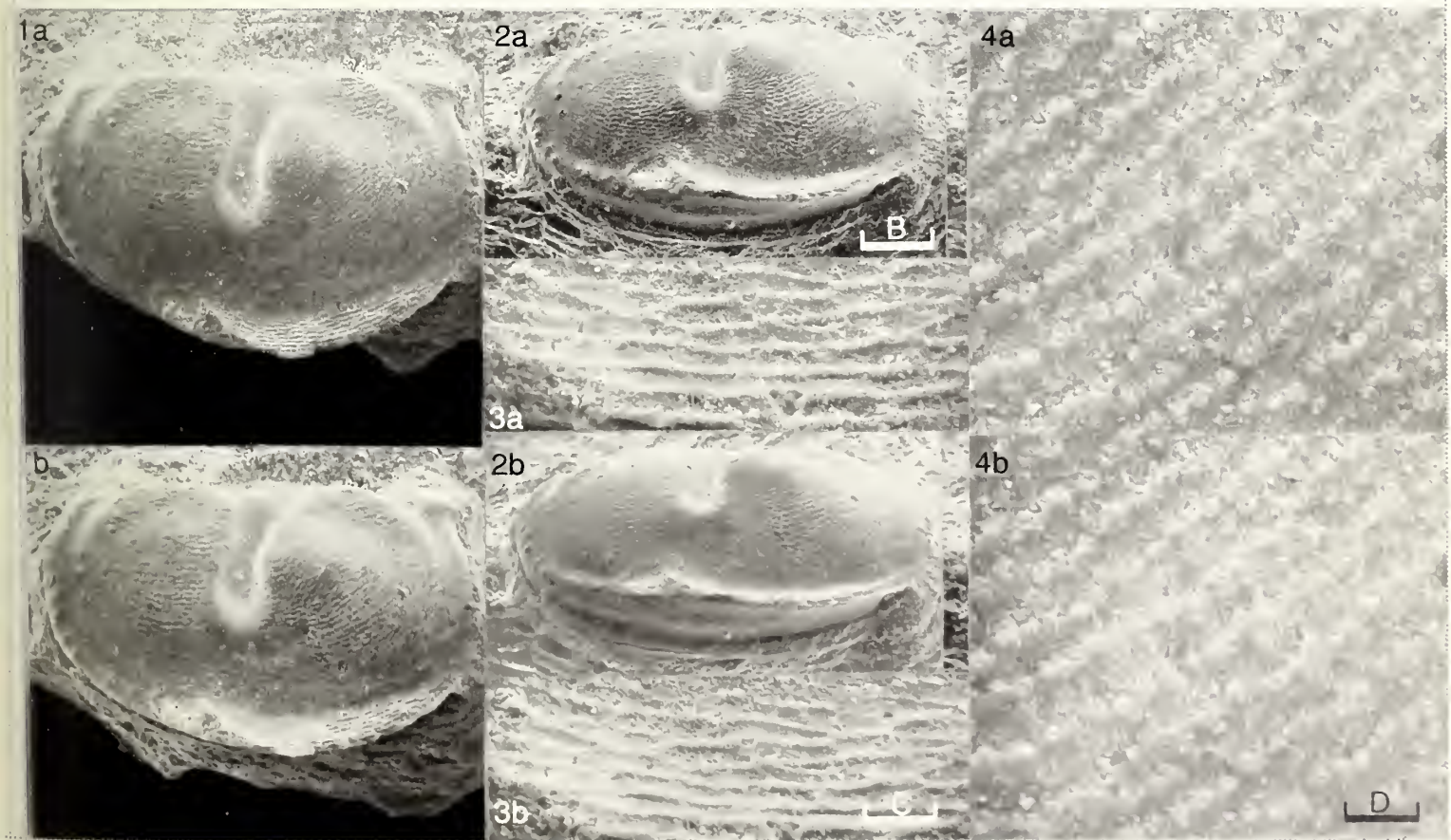
B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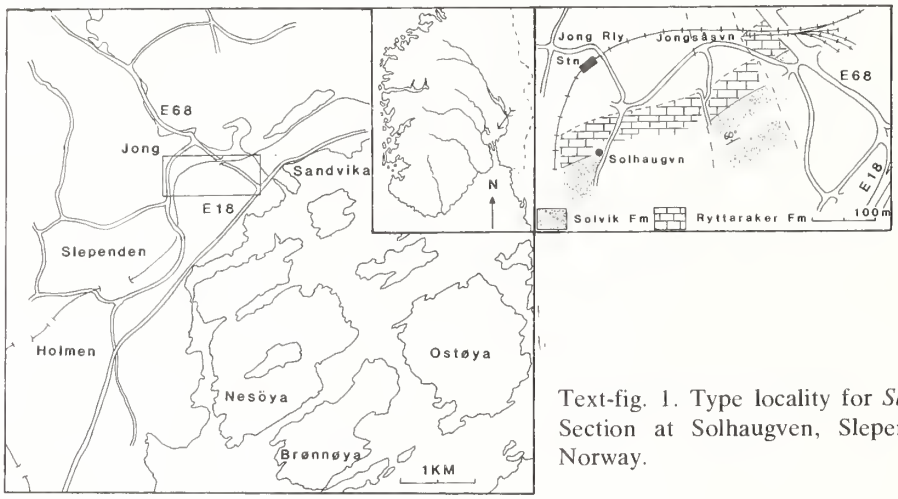
Remarks: Intraspecific variation of the velar flange occurs in tecnomorphs; most have a posteroventral restriction but in some specimens it appears weak or is lacking. Similarly, a hair-line-like syllobial grove is sometimes present (Pl. **12**, 86, fig. 4). The lobal reticulo-striations are in part composed of fine, linearly arranged granules (Pl. **12**, 88, fig. 4). Fine striae cover both velar flange and the weak torus (Pl. **12**, 88, figs. 2, 3).

Distribution: *S. armata* is known only from the middle Llandovery (Etage 6b-7b, lower silurian of the Oslo region, Norway, where it has been collected from localities at Ringerike, Asker, Skien, Hadeland and Holmestrand (Pollicott in prep.) All material occurs as calcareous valves in limestone.

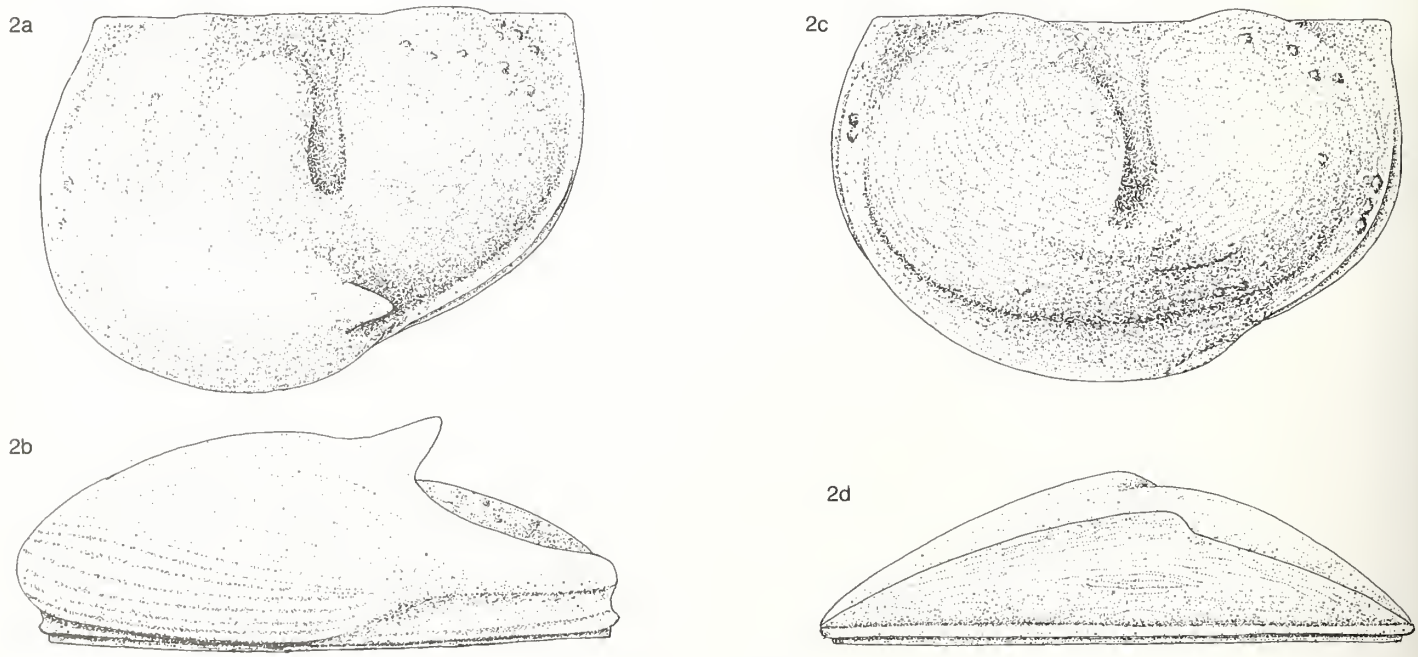


Text-fig. 1. Type locality for *Slependia armata*. Section at Solhaugven, Slependen in Asker, Norway.

Explanation of Plate 12, 90

Figs. 1, 2, ♂ RV (**PMO 113.166**, 1.52 mm long): fig. 1, ext. lat.; fig. 2, reticulo-striation and tubercles on post. lobe. Fig. 3, ♀ RV, ext. lat. (**PMO 113.167**, 1.72 mm long).

Scale A (240μm; ×41), fig. 1; scale B (24μm; ×418), fig. 2; scale C (290μm; ×35), fig. 3.

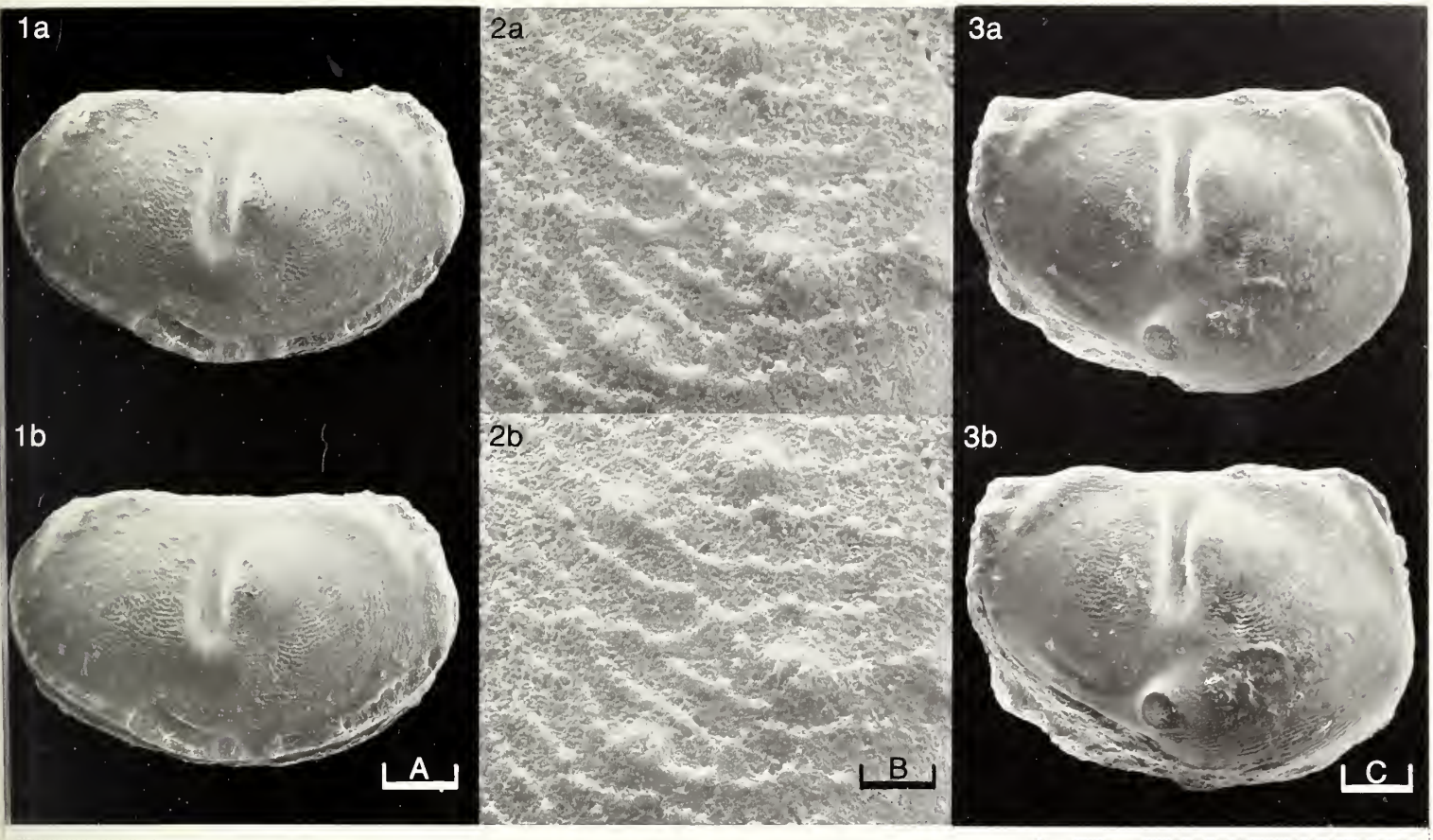


Text-fig. 2. Reconstructions of *Slependia armata*. 2a, b, ♀LV (based on **PMO 113.69**): a, ext. lat.; b, ext. vent. 2c, d, ♂LV (based on **PMO 113.64**): c, ext. lat.; b, ext. vent.

Explanation of Plate 12, 92

Fig. 1, ♂ LV (**PMO 113.168**, 1.52 mm long). Figs. 2, 3, ♀ LV (**PMO 113.169**, 1.80 mm long): fig. 2, reticulo-striation on ant. lobe; fig. 3, ext. lat.

Scale A (255μm; ×39), fig. 1; scale B (23μm; ×430), fig. 2; scale C (300μm; ×33), fig. 3.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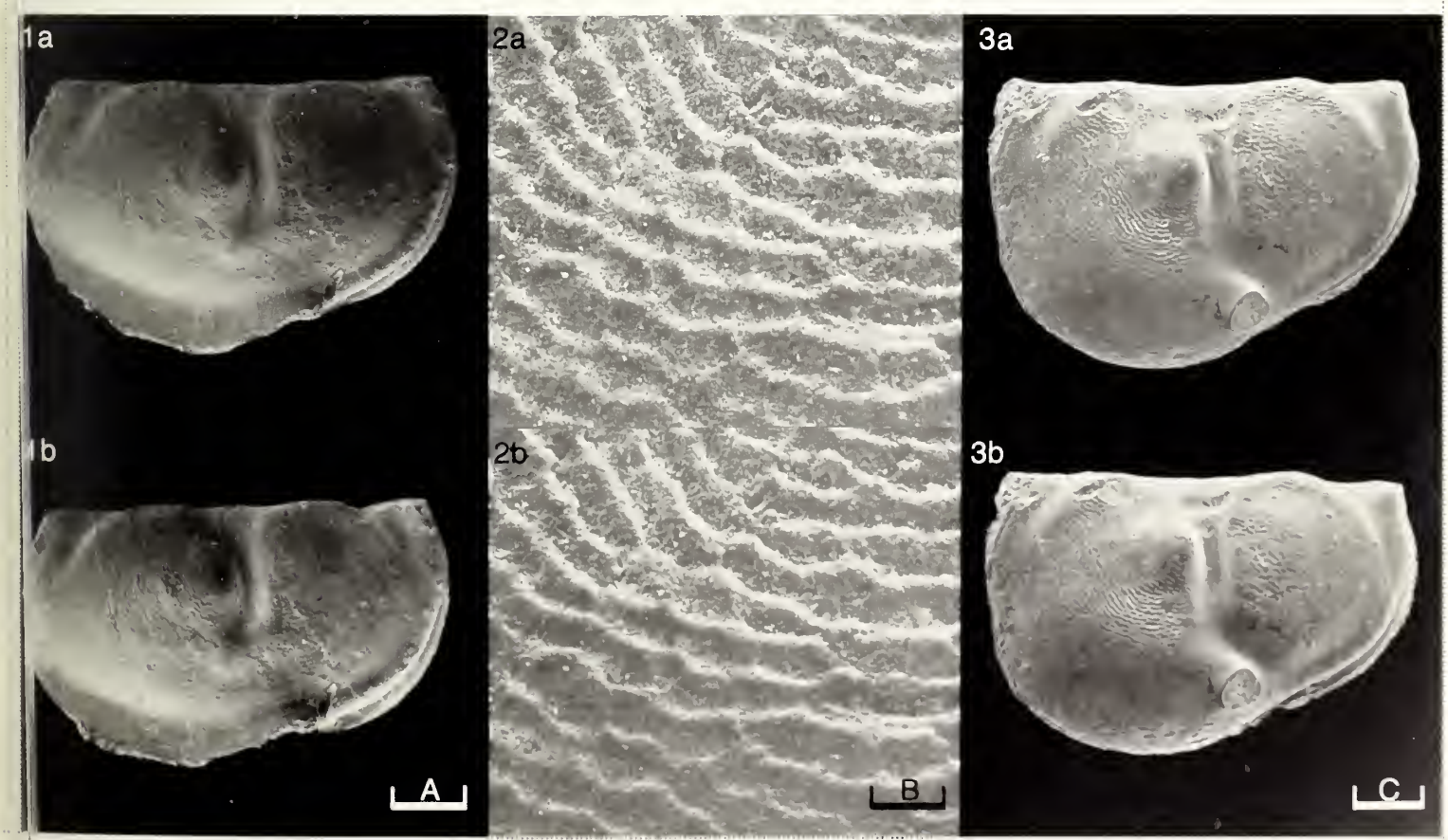
C


1a
1b
A
2a
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3a
3b
C

595.337.14 (119.9) (430 : 161.010.54 + 493 : 161.004.51 + 262.26 : 161.002.51 + 420 : 162.003.50 + 420 : 161.000.52) : 551.351

ON *LEPTOCYTHERE BALTICA* KLIE

by David J. Horne & John E. Whittaker
(City of London Polytechnic, & British Museum (Natural History), London)

Leptocythere baltica Klie, 1929

1869 *Cythere porcellanea* Brady; G. S. Brady & D. Robertson, *Ann Mag. nat. Hist.*, (ser. 4) **3**, 366-367 (*pars*), pl. 19, figs. 1-4; *non* Brady, 1869.

1929 *Leptocythere baltica* sp. nov. W. Klie, *Z. wiss. Zool.*, **134**, 279-282, text-figs. 8-11.

Type specimens: Zoologisches Museum, Hamburg, W Germany, nos. **61-63** (many specimens preserved in glycerine), **63a** and **1346** (male dissection slides).

Type locality: Kiel Bay, W Germany (western Baltic), approx. lat. 54° 25′N, long. 10° 30′E; Recent, littoral.

Explanation of Plate 12, 94

Fig. 1, ♀ car., rt. lat. (syntype, Hamburg Museum specimen **A**, 480μm long); fig. 2, ♂ car., lt. lat. (**1.06.21**, 550μm long); fig. 3, ♀ car., lt. lat. (**1.06.20**, 520μm long).
Scale A (100μm; × 125), figs. 1-3.

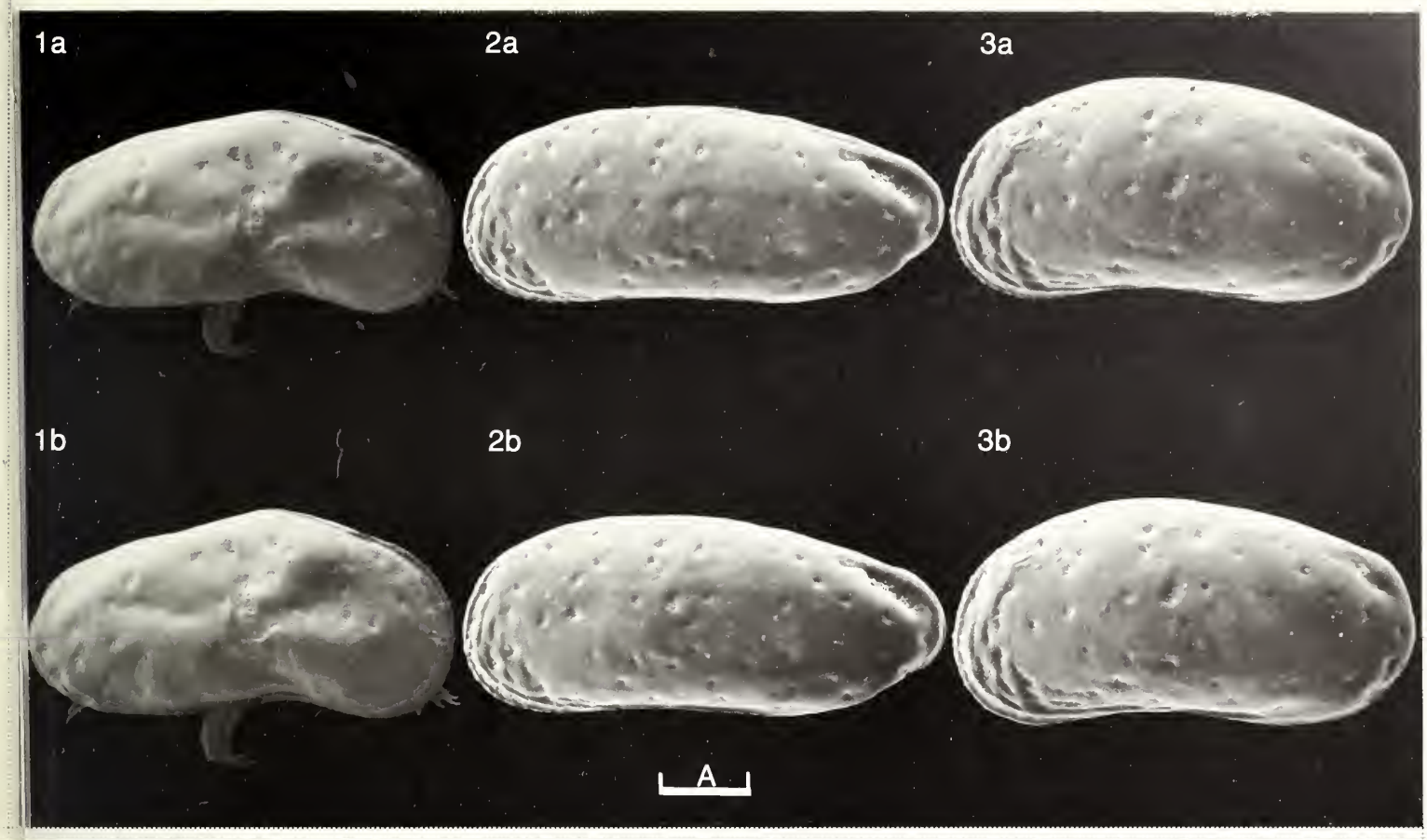
Figured specimens: Zoologisches Museum, Hamburg, W Germany, specimen **A** (syntype, ♀ car.: Pl. **12**, 94, fig. 1), specimen **B** (syntype, ♂ copulatory appendage: Text-fig. 1a). Hancock Museum, Newcastle-upon-Tyne, England, nos. **1.06.21** (♂ car.: Pl. **12**, 94, fig. 2), **1.06.20** (♀ car.: Pl. **12**, 94, fig. 3). Brit. Mus. (Nat. Hist.), nos. **1985.93** (♀ car.: Pl. **12**, 96, fig. 1), **1985.94** (♀ car.: Pl. **12**, 96, fig. 2), **1985.95** (♂ LV: Pl. **12**, 96, fig. 3).

The Hamburg Museum specimens are from the Klie collection: **A** from tube **61** and **B** from dissection slide **1346**. The Hancock Museum specimens, from the River Scheldt, Belgium, were both taken from slide no. **2.11.19** in the Brady collection and were listed in Brady's notebook as "*Cythere porcellanea*". British Museum (Nat. Hist.) no. **1985.93** is from a core sample (? sub-Recent) taken in the Sandettie-Fairy Bank area of the southern N Sea (approx. lat. 51° 20′N, long. 2° 10′E); no. **1985.94** was collected by J. E. Whittaker from Smallmouth, The Fleet, Dorset, S England (approx. lat. 50° 35′N, long. 2° 30′W); and no. **1985.95** is from Boston, Lincolnshire, E England (approx. lat. 52° 55′N, long. 0° 03′E) and was provided by J. E. Robinson.

Diagnosis: Small to medium sized (450-550μm long) species of *Leptocythere*. Valves ornamented with scattered shallow pits; posterodorsal marginal area compressed, posteroventral alar protuberances absent. Greatest height in front of mid-length, greatest width close to mid-length. Colour white in living specimens. Distal process of male copulatory appendage sub-triangular with a reduced, pointed anteroventral corner and a produced, sub-rounded posteroventral corner.

Explanation of Plate 12, 96

Fig. 1, ♀ car., dors. (**1985.93**, 500μm long); fig. 2, ♀ car., rt. lat. (**1985.94**, 460μm long); fig. 3, ♂ LV, int. lat. (**1985.95**, 490μm long).
Scale A (100μm; × 125), figs. 1-3.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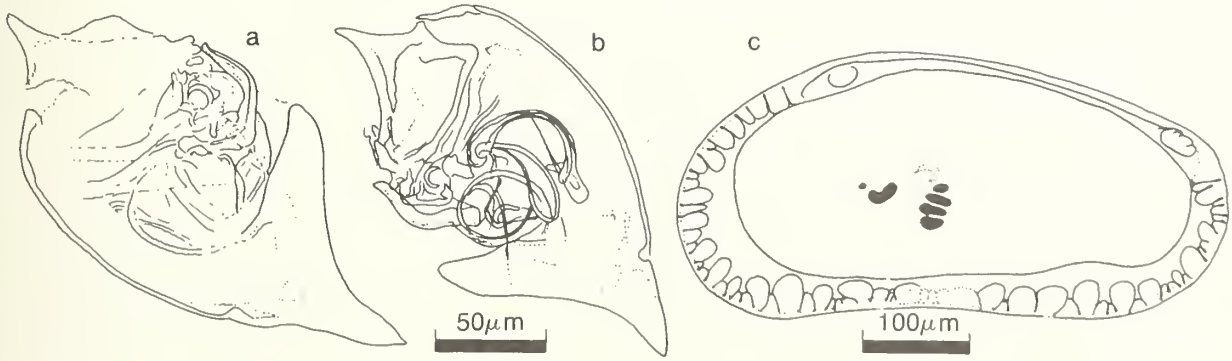
A

Remarks: Our comparison of Klie's type material of *L. baltica* with the specimens illustrated by Brady & Robertson (1869, *op. cit.*) as *Cythere porcellanea* Brady (*non* Brady, 1869; see Horne & Whittaker, *Stereo-Atlas of Ostracod Shells*, **12** (19) 99-106, 1985) has show that they are conspecific. Klie's syntypes are decalcified and do not retain their shape when removed from their glycerine preserving medium. Nevertheless one such specimen is illustrated herein for comparative purposes.

Distribution: Recent; littoral, in marine or slightly reduced salinities, on sand associated with algae. Coasts of NW Europe, including the western Baltic (Klie, *op. cit.* and authors' collections).



Text-fig. 1. *Leptocythere baltica*: a, male copulatory appendage, syntype (Hamburg Museum specimen **B**; slide no. **1346**); b, male copulatory appendage; c, ♀RV, int. lat., seen in transmitted light. Drawings b-c are based on study of several British specimens.

595.337.14 (119.9) (493 : 161.004.51 + 420 : 162.002.50) : 551.313.2

ON *LEPTOCYTHERE PORCELLANEA* (BRADY)

by David J. Horne & John E. Whittaker
(City of London Polytechnic & British Museum (Natural History), London)

Leptocythere porcellanea (Brady, 1869)

1869 *Cythere porcellanea* sp. nov. G. S. Brady, *Ann. Mag. nat. Hist.*, (ser. 4) **3**, 47, pl. 7. figs. 1-4.
1869 *Cythere porcellanea* Brady; G. S. Brady & D. Robertson, *Ann. Mag. nat. Hist.* (ser. 4) **3**, 366-367 (*pars*); *non* pl. 19, figs. 1-4.
1909 *Cythere ilyophila* sp. nov. N. Hirschmann, *Meddn. Soc. Fauna Flora fenn.*, **35**, 289, text-figs. 5, 6.
1938 *Leptocythere ilyophila* (Hirschmann); W. Klie, *in*: F. Dahl, *Die Tierwelt Deutschlands*, **34** (3), 169, text-figs. 560, 561.

Lectotype: Hancock Museum, Newcastle-upon-Tyne, England, no. **1.39.37**, carapace.
Type locality: River Scheldt, near Antwerp, Belgium; approx. lat. 51° 18′N, long. 4° 20′E; Recent.
Figured specimens: Hancock Museum, no. **1.39.37** (Lectotype, ♀ car.: Pl. **12**, 100, fig. 1). British Museum (Nat. Hist.), nos. **1985.96** (♀ car.: Pl. **12**, 100, fig. 2), **1985.97** (♂ car.: Pl. **12**, 100, fig. 3), **1985.98** (♂ car.: Pl. **12**, 102, fig. 1), **1985.99** (♀ car.: Pl. **12**, 102, fig. 2), **1985.100** (♀ LV: Pl. **12**, 102, fig. 3), **1985.101** (♂ car.: Pl. **12**, 104, fig. 1), **1985.102** (♀ car.: Pl. **12**, 104, fig. 2), **1985.103** (♀ car.: Pl. **12**, 104, fig. 3), **1985.104** (♂ RV: Pl. **12**, 106, fig. 1), **1985.105** (♀ car.: Pl. **12**, 106, fig. 2), **1985.106** (juv. – 1 car.: Pl. **12**, 106, fig. 3). The lectotype was taken from slide no. **2.04.02** in the G. S. Brady Collection, Hancock Museum. British Museum (Nat. Hist.) nos. **1985.96-106** were all collected in 1959-60 by J. W. Murray from Mother Siller's Channel, a tidal creek in Christchurch Harbour, Dorset, S England; approx lat. 50° 43′N, long. 1° 45′W; Recent, brackish water.

Explanation of Plate 12, 100

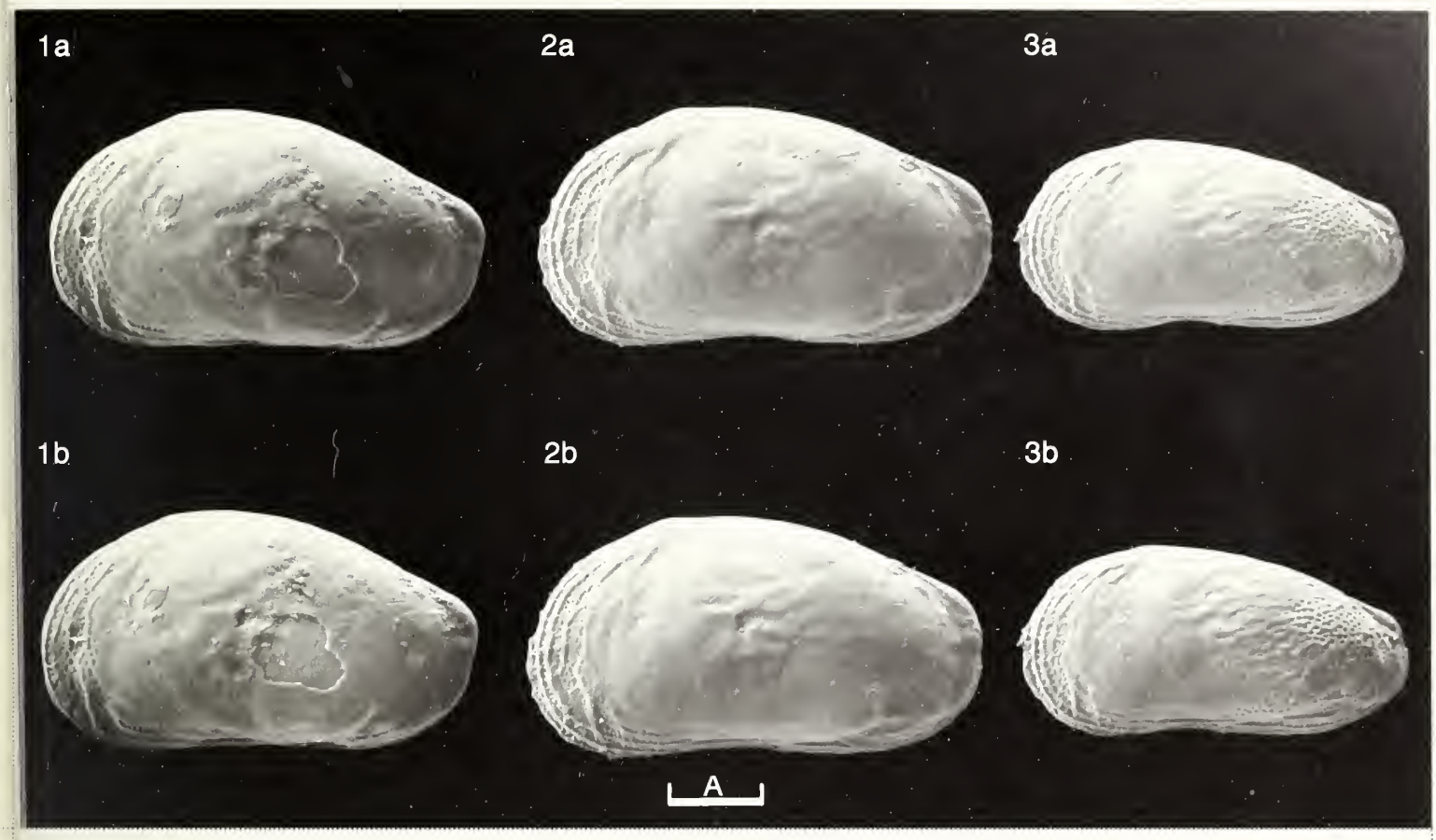
Fig. 1, ♀ car., lt. lat. (smooth form; lectotype, **1.39.37**, 490 μm long); fig. 2, ♀ car., lt. lat. (smooth form; **1985.96**, 510 μm long); fig. 3, ♂ car., lt. lat. (**1985.97**, 430 μm long).
Scale A (100 μm; × 125), figs. 1-3.

Diagnosis: Small to medium sized (450-550 μm long) species of *Leptocythere*. Greatest height well in front of mid-length, valves smooth or pitted, with prominent posteroventral alar protuberances. In dorsal view, greatest width in front of mid-length. Colour buff or light brown in living specimens. Distal process of male copulatory appendage subtriangular with a pointed anteroventral corner and a moderately produced, subrounded posteroventral corner; free end of *ductus ejaculatorius* relatively short.

Remarks: The original description of *C. porcellanea* was, according to Brady (1869, *op. cit.*), based on a single specimen. Later in the same year Brady & Robertson (1869, *op. cit.*), in possession of additional material, felt it necessary to redescribe the species . . . "The Dutch specimens from which this species was originally described appear to either young or stunted individuals; and the figures which accompanied the description do not give a correct idea of the adult shell". The type slide in the Hancock Museum was found to contain not one but two specimens (but note Brady & Robertson's reference to the original material in the plural), both adults and matching the original description and illustrations; one of these, which we believe to be the specimen illustrated by Brady, has been selected by us as lectotype. This is clearly conspecific with *Leptocythere ilyophila* (Hirschmann, 1909), by which name this species has been hitherto commonly known. A second slide (Hancock Museum no. **2.11.19**) was found to contain 11 specimens, listed in Brady's notebook as *Cythere porcellanea*, which clearly represent the additional material on which Brady & Robertson's re-description was based. Of these, the largest specimens correspond to Brady & Robertson's new illustrations of *Cythere porcellanea*; these are not conspecific with the original type material and are referable to *Leptocythere baltica* Klie, 1929 (see Horne & Whittaker, *Stereo-Atlas Ostracod Shells* **12** (18) 93-98, 1985).

Explanation of Plate 12, 102

Fig. 1, ♂ car., rt. lat. (**1985.98**, 440 μm long); fig. 2, ♀ car., lt. lat. (ornamented form; **1985.99**, 480 μm long); fig. 3, ♀ LV, int. lat. (**1985.100**, 500 μm long).
Scale A (100 μm; × 125), figs. 1-3.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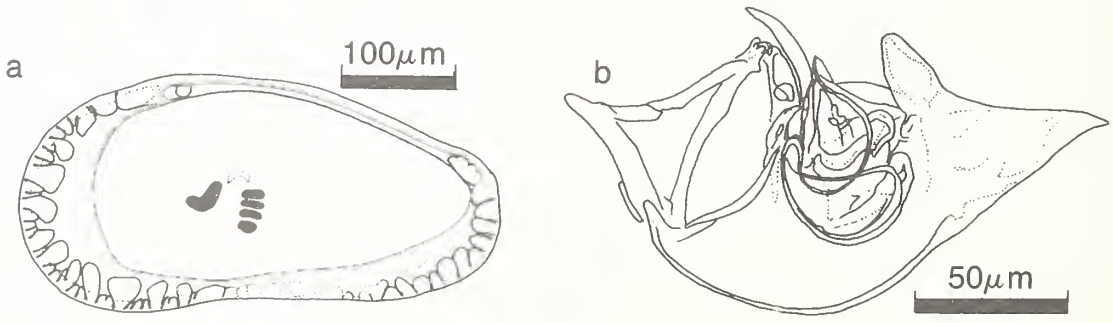
Remarks (contd.): Like many other *Leptocythere* species, *L. porcellanea* exhibits considerable variation in carapace ornament. Both smooth (see Pl. **12**, 100, fig. 2) and pitted (see Pl. **12**, 102, fig. 2) females may be found in the same population, while males are usually pitted only in the posterior third of the shell.

Distribution: Recent; brackish, estuarine creeks, on stable mud substrates. Coasts of NW Europe, including the Baltic (authors' collections).

Explanation of Plate 12, 104

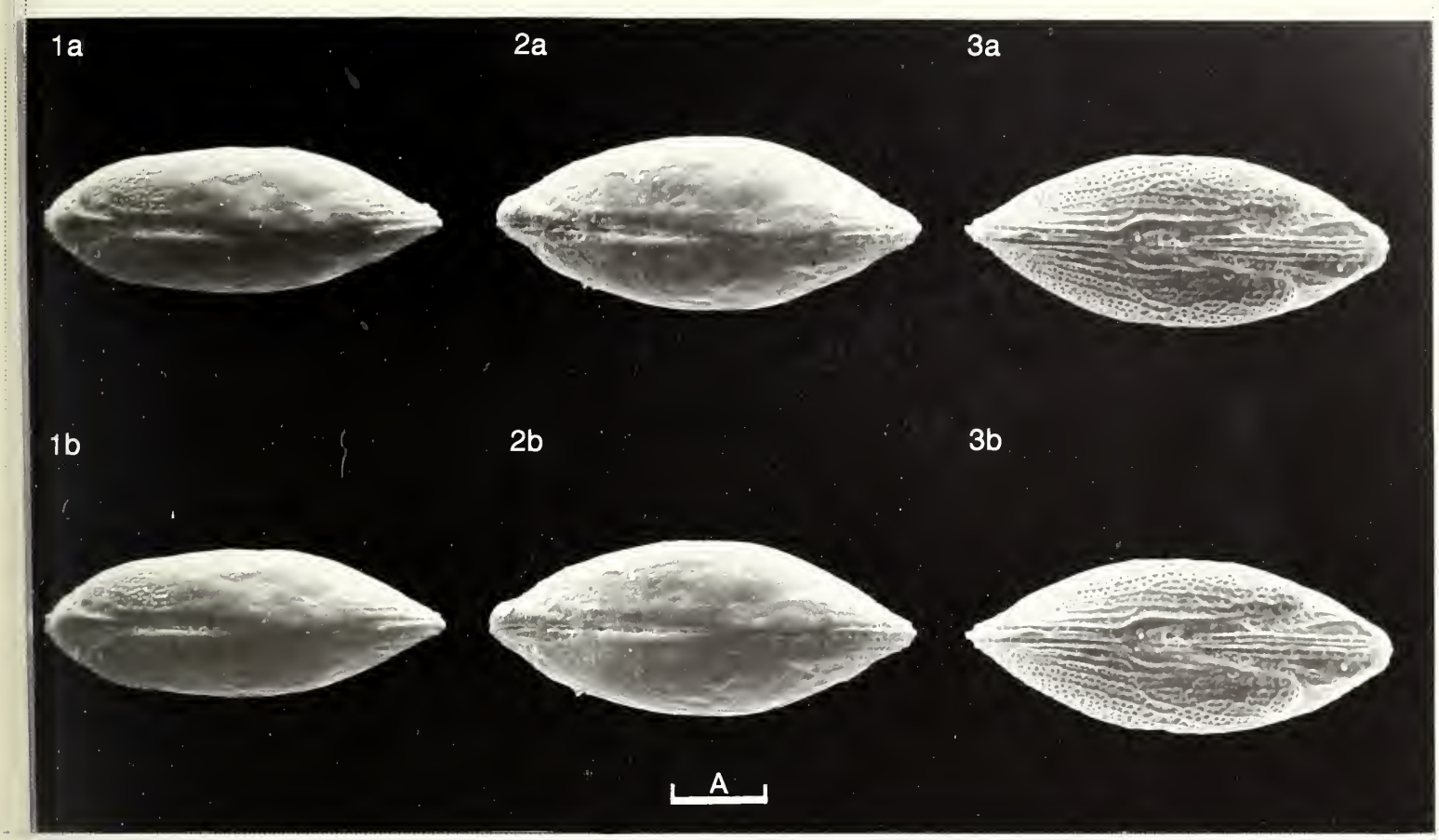
Fig. 1, ♂ car., dors. (**1985.101**, 450 μm long); fig. 2, ♀ car., dors. (smooth form; **1985.102**, 480 μm long); fig. 3, ♀ car., vent. (ornamented form; **1985.103**, 480 μm long).
Scale A (100 μm; × 125), figs. 1-3.



Text-fig. 1. *Leptocythere porcellanea*: a, ♂RV, int. lat., seen in transmitted light; b, ♂ copulatory appendage. Both drawings based on study of several British specimens.

Explanation of Plate 12, 106

Fig. 1, ♂ RV, int. lat. with appendages (**1985.104**, 430 μm long); fig. 2, ♀ car., lt. lat. (ornamented form; **1985.105**, 510 μm long); fig. 3, juv. (− 1) car., lt. lat. (**1985.106**, 420 μm long).
Scale A (100 μm; × 125), figs. 1-3.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595.337.14 (118.15) (430.1 : 161.006.51) : 551.351 + 552.51

ON *SARSICYTHERIDEA LIENENKLAUSI* (KUIPER)

by Roseline H. Weiss
(Geological Institute, University of Cologne, Germany)

Sarsicytheridea lienenklausi (Kuiper, 1918)

*1918	*Cytheridea lienenklausi* sp. nov.	W. N. Kuiper, *Diss. Univ. Groningen*, 31, pl. 1, fig. 10.
1957	*Haplocytheridea curvata* (Lienenklaus)	A. J. Keij, *Mem. Inst. r. Sci. nat. Belg.*, **136**, 59, pl. 2, figs. 9, 10, pl. 3, figs. 17-21.
? 1958	*Cytheridea* sp. 1	C. Ellermann, *Fortschr. Geol. Rheinld. Westf.*, **1**, 210, tab. 2.
? 1960	*Cytheridea* sp. 1	C. Ellermann, *Geol. Jb.*, **77**, 696, tab. 56.
non 1962	*Eucytheridea lienenklausi* (Kuiper)	M. A. A. Bassiouni, *Roemeriana*, **3**, 19, pl. 2, figs. 4a-c, 5a-c.
1963	*Eucytheridea lienenklausi* (Kuiper)	van den Bold, *Neues Jb. Geol. Paläont., Mh.*, **1963**, 114, figs. 1a-c, *non* fig. 1d.
1983	*Sarsicytheridea lienenklausi* (Kuiper)	R. H. Weiss, *Palaeontographica* Abt. A, **182** (4-6), 100, pl. 25, figs. 1, 5, 6, pl. 26, figs. 1-8, text-figs. 14, 15.

Type specimens: The types of *S. lienenklausi* are not amongst Kuiper's Collection at Rijks Geologische Dienst Haarlem, Netherlands and are presumed lost.

Type locality: Boring 22 (Liessel), Gemeente Deurne, Sectie H, perceel 3754, Netherlands; Miocene (100-190 m depth).

Explanation of Plate 12, 108

Fig. 1, ♀ car., ext. dors. (**GIK 932-1807**, 725 μm long); fig. 2, ♂ car., ext. vent. (**GIK 932-1803**, 763 μm long).
Scale A (100 μm; × 125), figs. 1, 2.

Figured specimens: Geologisches Institut, University of Cologne (**GIK**), nos. **932-1801** (♂ RV: Pl. **12**, 114, fig. 2), **932-1802** (♂ LV: Pl. **12**, 112, fig. 1), **932-1803** (♂ car.: Pl. **12**, 108, fig. 2), **932-1805** (♂ LV: Pl. **12**, 112, fig. 2), **932-1806** (♂ RV: Pl. **12**, 110, fig. 2), **932-1807** (♀ car.: Pl. **12**, 108, fig. 1), **932-1809** (♀ RV: Pl. **12**, 114, fig. 1), **932-1811** (♀ RV: Pl. **12**, 110, fig. 1).

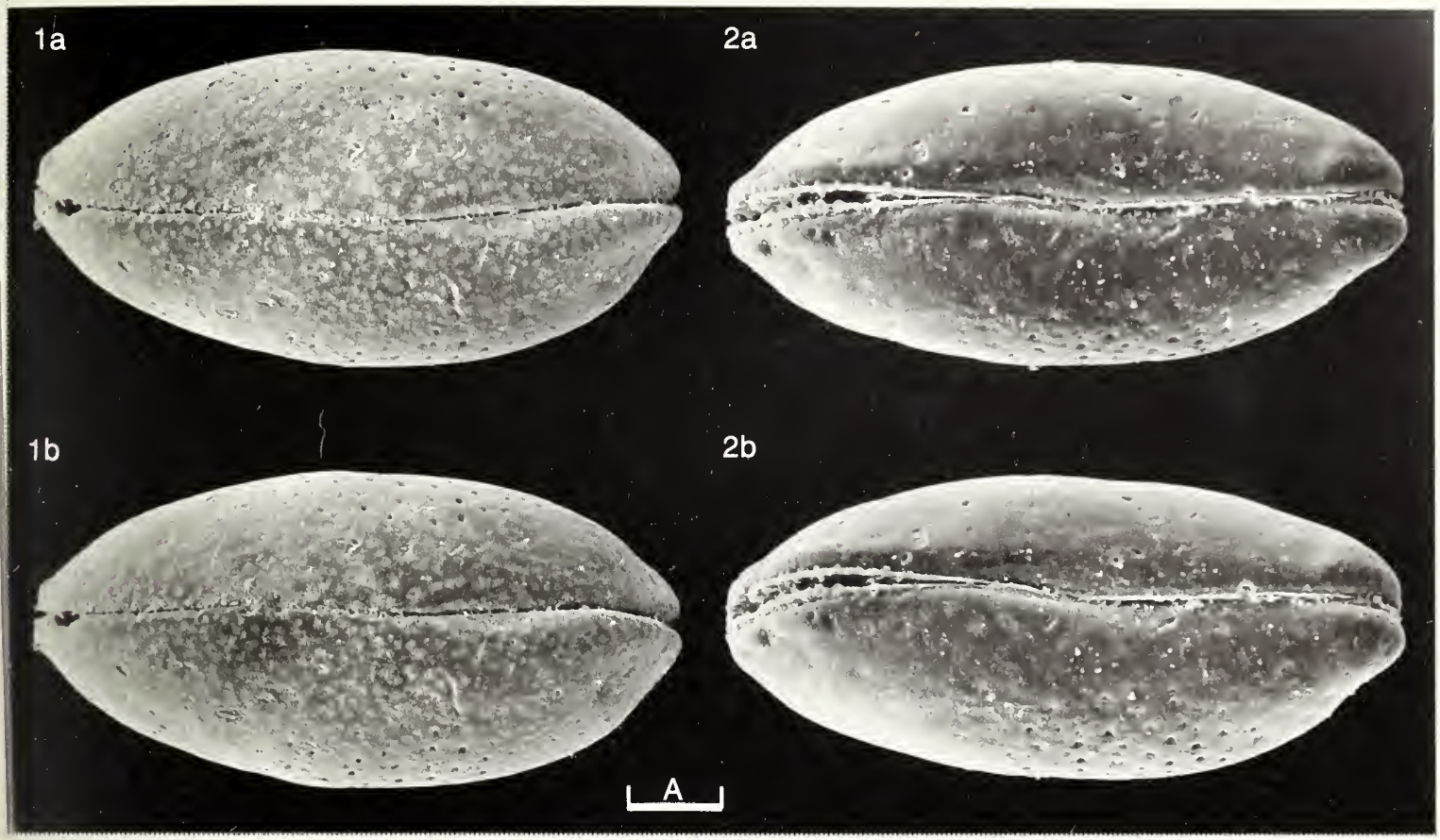
All specimens were collected by Prof. E. K. Kempf in 1961 at a depth of 54.2-55.5 m from shaft Tönisberg near Krefeld, Germany (German Nat. Grid Ref.: R 34033, H 97555; long. 6° 29′E, lat. 51° 25′N); upper Oligocene, *Sphenolithus ciperoensis* Zone (NP25) according to Benedek & Müller (*Neues Jb. Geol. Paläont., Mh.*, **1974**, 388); fine sand (grain size 0.2-0.06 mm = 92.5%) with abundant molluscs and foraminifera according to Kempf (*Niederrhein,* Krefeld, **35**, fig. 2, 1968); shallow marine (5-20 m water depth) according to Goerlich (*Fortschr. Geol. Rheinld. Westf.*, **1**, 220, 1958).

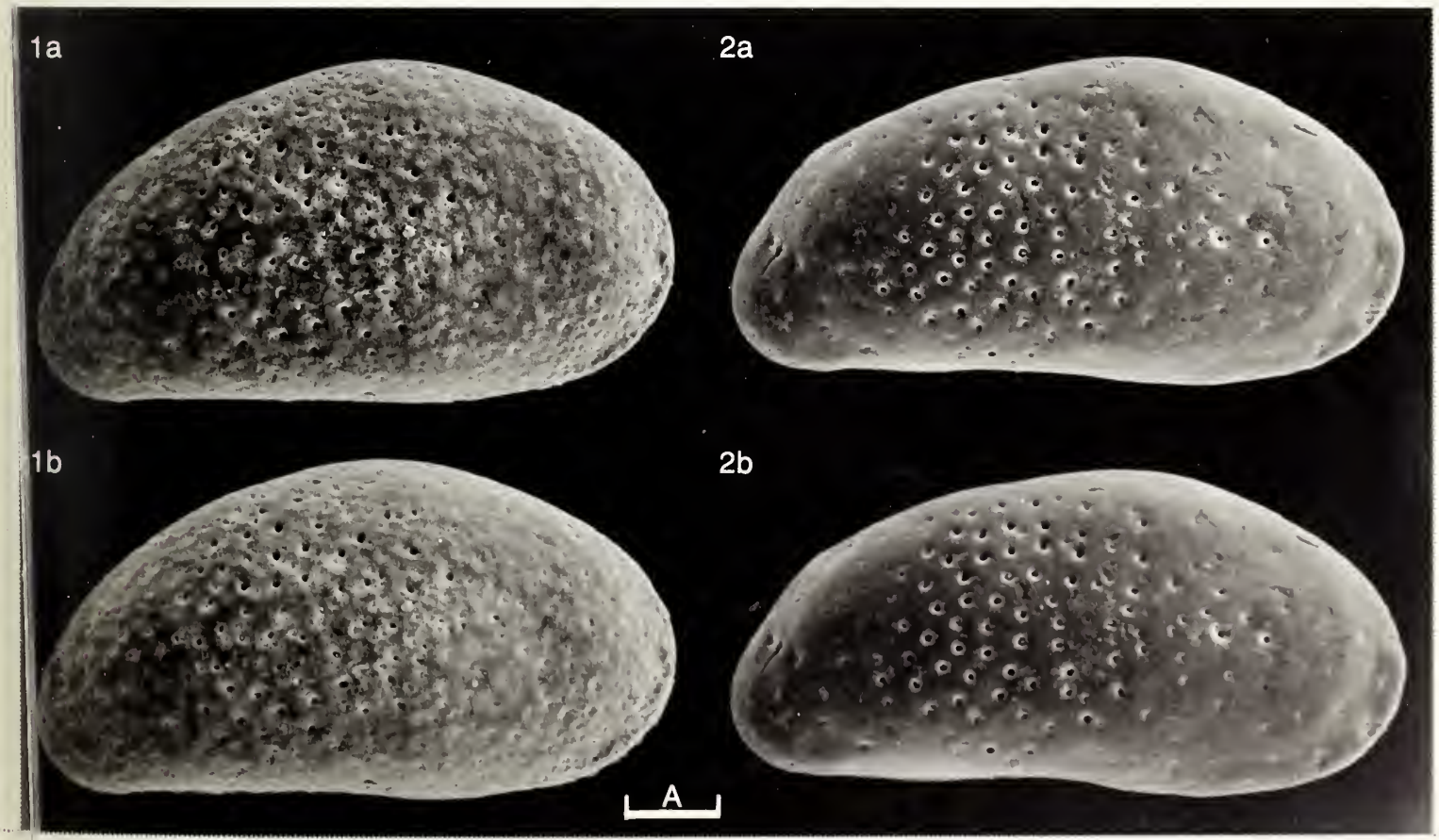
Diagnosis: In dorsal view carapace lenticular, sides regularly rounded, anterior end with slightly projecting lip in each valve, posterior end slightly indented at the line of junction of the valves; subtrapezoidal in lateral view, anterior end obliquely rounded, dorsal margin straight to slight convex. Posterior end narrowly rounded posteroventrally, ventral margin in left valve straight, very slightly concave in right valve. Left valve larger, overlapping the right valve almost along the entire periphery, except parts of the ventral margin (in front of the middle and at the posterior end) where the right valve overlaps the left. Surface finely pitted. Anteriorly and posteroventrally vestibules are present.

Remarks: Sexual dimorphism pronounced, the males being lower, more elongate and in dorsal view narrower. Differences discussed in detail by Weiss (1983, *op. cit.*). With respect to internal features *Sarsicytheridea lienenklausi* is very similar to *S. kempfi* Weiss (see *Stereo-Atlas of Ostracod Shells* **12** (21), 115, 1985). Differences are observable in the distribution pattern of normal pore-canals. Furthermore two types of normal pore-canals are present: with sieve-plates and those of funnel-type. The latter type is present at the anterior end of the both valves and normally shows a lip around the opening.

Explanation of Plate 12, 110

Fig. 1, ♀ RV, ext. lat. (**GIK 932-1811**, 713 μm long); fig. 2, ♂ RV, ext. lat. (**GIK 932-1806**, 750 μm long).
Scale A (100 μm; × 127), figs. 1, 2.


1a
2a
1b
2b
A


1a
2a
1b
2b
A

Size:

(A)			L (μm)			H (μm)			L/H		
	Sex	N	x̄	Min	Max	x̄	Min	Max	x̄	Min	Max
	♀♀RV	5	723	713	750	379	375	388	1.909	1.876	1.935
	♂♂RV	5	748	725	775	363	338	375	2.078	2.034	2.140
	♀♀LV	5	725	713	750	393	388	400	1.845	1.812	1.875
	♂♂LV	5	748	725	775	373	350	388	2.008	1.967	2.071

(B)			L (μm)			W (μm)			L/W		
	Sex	N	x̄	Min	Max	x̄	Min	Max	x̄	Min	Max
	♀♀car.	5	718	700	725	365	350	375	1.967	1.934	2.000
	♂♂car.	13	739	713	763	348	338	363	2.122	2.034	2.185

Table. 1. Measurements on specimens: N = no. of specimens; x̄ = mean; L = length; H = height; W = width; A = valves; B = carapaces.

Distribution: Miocene: Deurne, Swalmen and Sevenum (borings), Netherlands (Kuiper 1918, *op. cit.*); Odijk near Utrecht (boring), Netherlands.

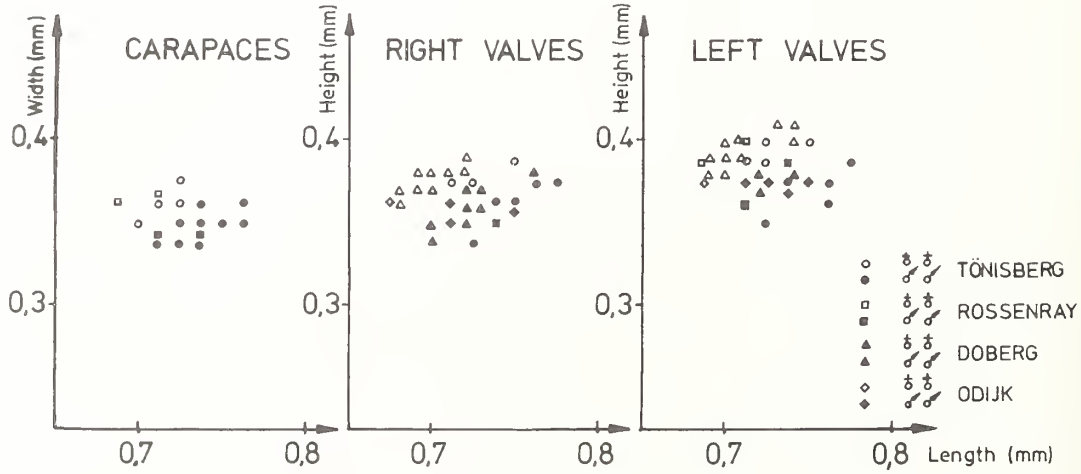
Upper Oligocene: Sevenum, Netherlands (Kuiper 1918, *op. cit.*); Shaft Kapellen, Lower Rhine Basin, Germany (Ellermann 1958, 1960, *op. cit.*); Shaft Rossenray, Lower Rhine Basin, Germany (van den Bold 1963, *op. cit.*); Shaft Tönisberg, Lower Rhine Basin, Germany (Weiss 1983, *op. cit.*); Doberg near Bünde, Germany.

Explanation of Plate 12, 112

Fig. 1, ♂ LV, int. lat. (**GIK 932-1802**, 738 μm long); fig. 2, ♂ LV, ext. lat. (**GIK 932-1805**, 750 μm long). Pl. **12**, 110, fig. 2 and Pl. **12**, 112, fig. 2 represent both valves of a single carapace.
Scale A (100 μm; × 127), figs. 1, 2.

Distribution (contd.): Middle Oligocene: Winterswijk (boring), Netherlands (Kuiper 1918, *op. cit.*); Bilzen-Katteberg and Kleine-Spouwen (borings), Belgium (Keij 1957, *op. cit.*).

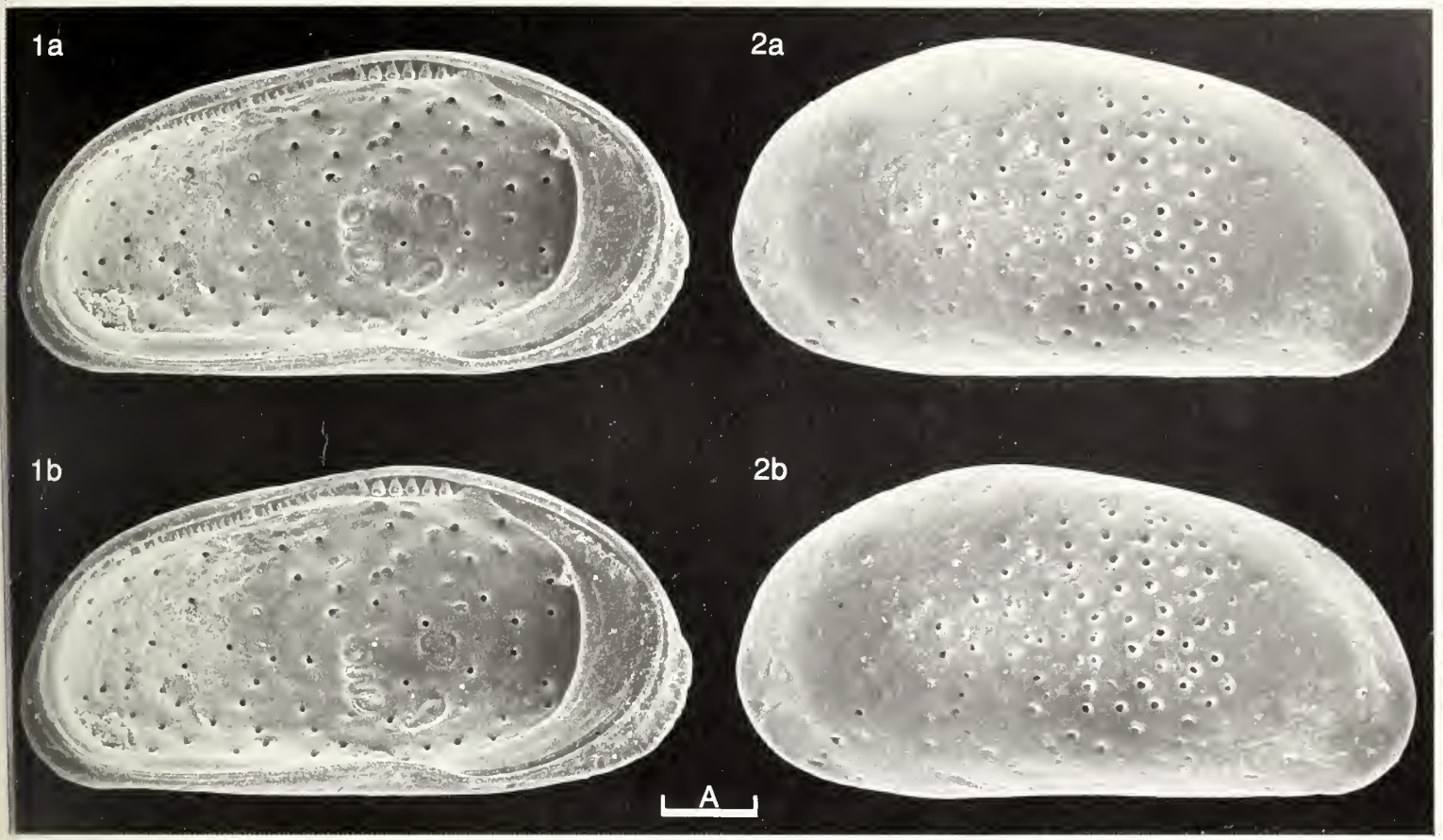
Acknowledgement: Thanks are due to the Deutsche Forschungsgemeinschaft for providing the Cambridge Stereoscan 180.

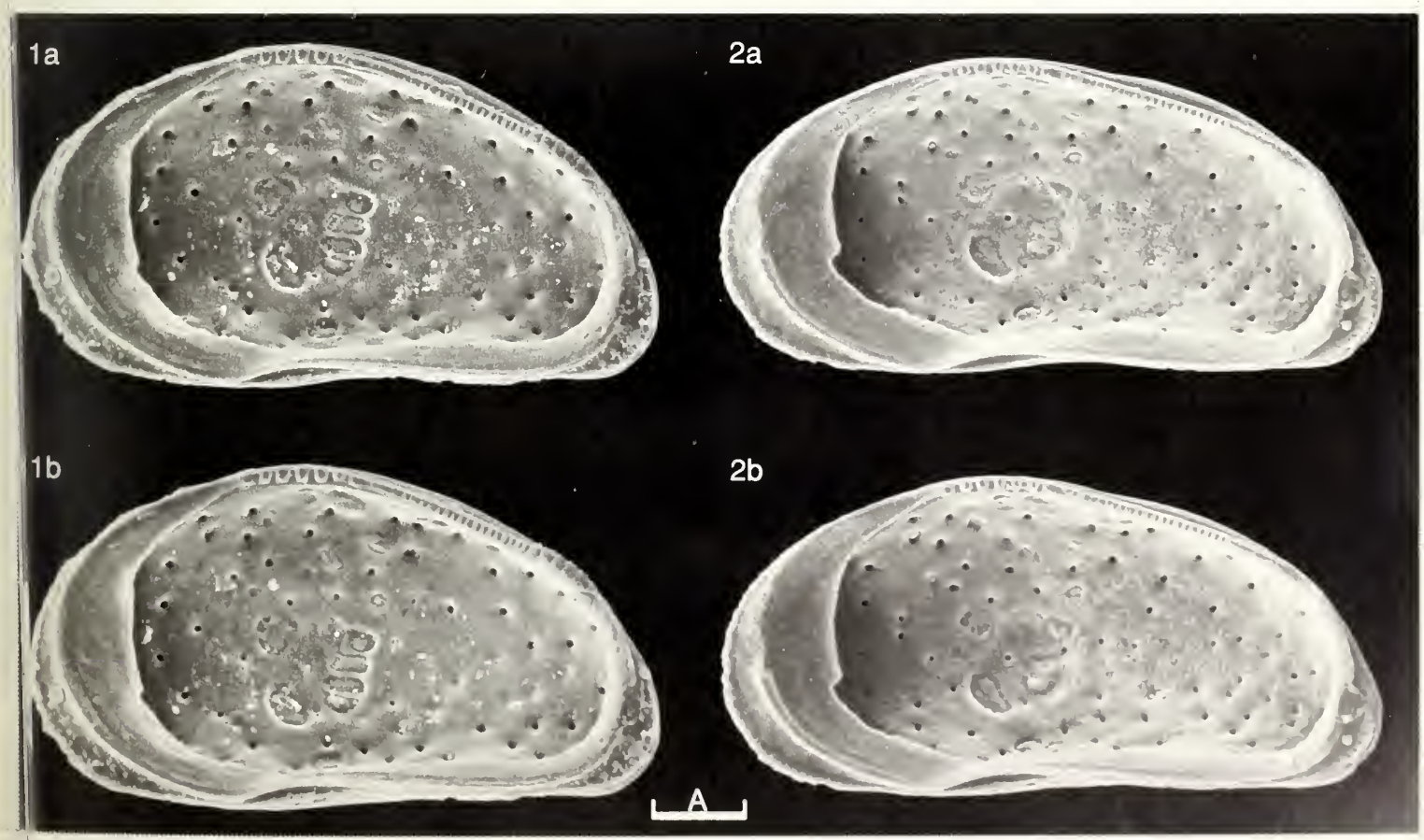


Text-fig. 1. Size distribution of adult specimens of *Sarsicytheridea lienenklausi* (Kuiper).

Explanation of Plate 12, 114

Fig. 1, ♀ RV, int. lat. (**GIK 932-1809**, 713 μm long); fig. 2, ♂ RV, int. lat. (**GIK 932-1801**, 738 μm long). Pl. **12**, 112, fig. 2 and Pl. **12**, 114, fig. 2 represent both valves of a single carapace.
Scale A (100 μm; × 127), figs. 1, 2.


1a
2a
1b
2b
A


1a
2a
1b
2b
A

Stereo-Atlas of Ostracod Shells 12 (21) 115-122 **(1985)**
595.337.14 (118.15) (430.1 : 161.006.51) : 551.351 + 552.51

ON *SARSICYTHERIDEA KEMPFI* WEISS sp. nov.

by Roseline H. Weiss
(Geological Institute, University of Cologne, Germany)

Sarsicytheridea kempfi sp. nov.

? 1958 *Haplocytheridea curvata* (Lienenklaus); F. Goerlich, *Fortschr. Geol. Rheinld. Westf.*, **1**, 216.
1963 *Eucytheridea lienenklausi* (Kuiper); van den Bold, *Neues Jb. Geol. Paläont., Mh.*, **1963**, 114, fig. 1d, *non* figs. 1a-c.
1975 *Eucytheridea curvata* (Lienenklaus); M. Faupel, *Göttinger Arb. Geol. Paläont.*, **17**, 27, pl. 8, fig. 5, *non* figs. 7a, b.
1983 *Sarsicytheridea* cf. *curvata* (Lienenklaus); R. H. Weiss, *Palaeontographica* Abt. A, **182** (4-6), 106, pl. 25, figs. 2-4, 7, pl. 27, figs. 1-8, pl. 28, figs. 1-6, text-fig. 16.

Holotype: Geologisches Institut, University of Cologne, Germany, **GIK 932-1826**; ♂ car.
[Paratypes: Geologisches Institut, University of Cologne, Germany, **GIK 932: 1814-1827**]

Type locality: Shaft Tönisberg near Krefeld, Germany (German Nat. Grid. Ref.: R 34033, H 97555; long. 6° 29′E, lat. 51° 25′N); depth range 54.2-55.5 m; Upper Oligocene, *Sphenolithus ciperoensis* Zone (NP 25) according to Benedek & Müller (*Neues Jb. Geol. Paläont., Mh.*, **1974**, 388); fine sand (grain size 0.2-0.06 mm = 92.5%) with abundant molluscs and foraminifera according to Kempf (*Niederrhein*, Krefeld, **35**, fig. 2, 1968); shallow marine (5-20 m water depth) according to Goerlich (*Fortschr. Geol. Rheinland. Westf.*, **1**, 220, 1958).

Explanation of Plate 12, 116

Fig. 1, ♀ car., ext. dors. (paratype, **GIK 932-1827**; 713 μm long); fig. 2, ♂ car., ext. vent. (holotype, **GIK 932-1826**; 750 μm long). Scale A (100 μm; × 128), figs. 1, 2.

Derivation of name: In honour of Prof. Dr. Eugen K. Kempf, my University Professor.

Figured specimens: Geologisches Institut, University of Cologne (GIK), nos. **932-1816** (♀ RV: Pl. **12**, 120, fig. 1), **932-1817** (♀ LV: Pl. **12**, 122, fig. 1), **932-1818** (♀ RV: Pl. **12**, 118, fig. 1), **932-1822** (♂ RV: Pl. **12**, 120, fig. 2), **932-1823** (♂ LV: Pl. **12**, 122, fig. 2), **932-1824** (♂ RV: Pl. **12**, 118, fig. 2), **932-1826** (♂ car.: Pl. **12**, 116, fig. 2), **932-1827** (♀ car.: Pl. **12**, 116, fig. 1). All from the type locality.

Size:

(A)

Sex	N	L (μm) $\bar{x}$	L (μm) Min	L (μm) Max	H (μm) $\bar{x}$	H (μm) Min	H (μm) Max	L/H $\bar{x}$	L/H Min	L/H Max
♀♀RV	7	691	675	713	364	350	375	1.898	1.835	1.931
♂♂RV	5	728	713	750	355	338	363	2.050	2.000	2.111
♀♀LV	7	695	675	713	391	375	400	1.777	1.719	1.806
♂♂LV	5	728	713	738	373	363	375	1.953	1.933	1.967

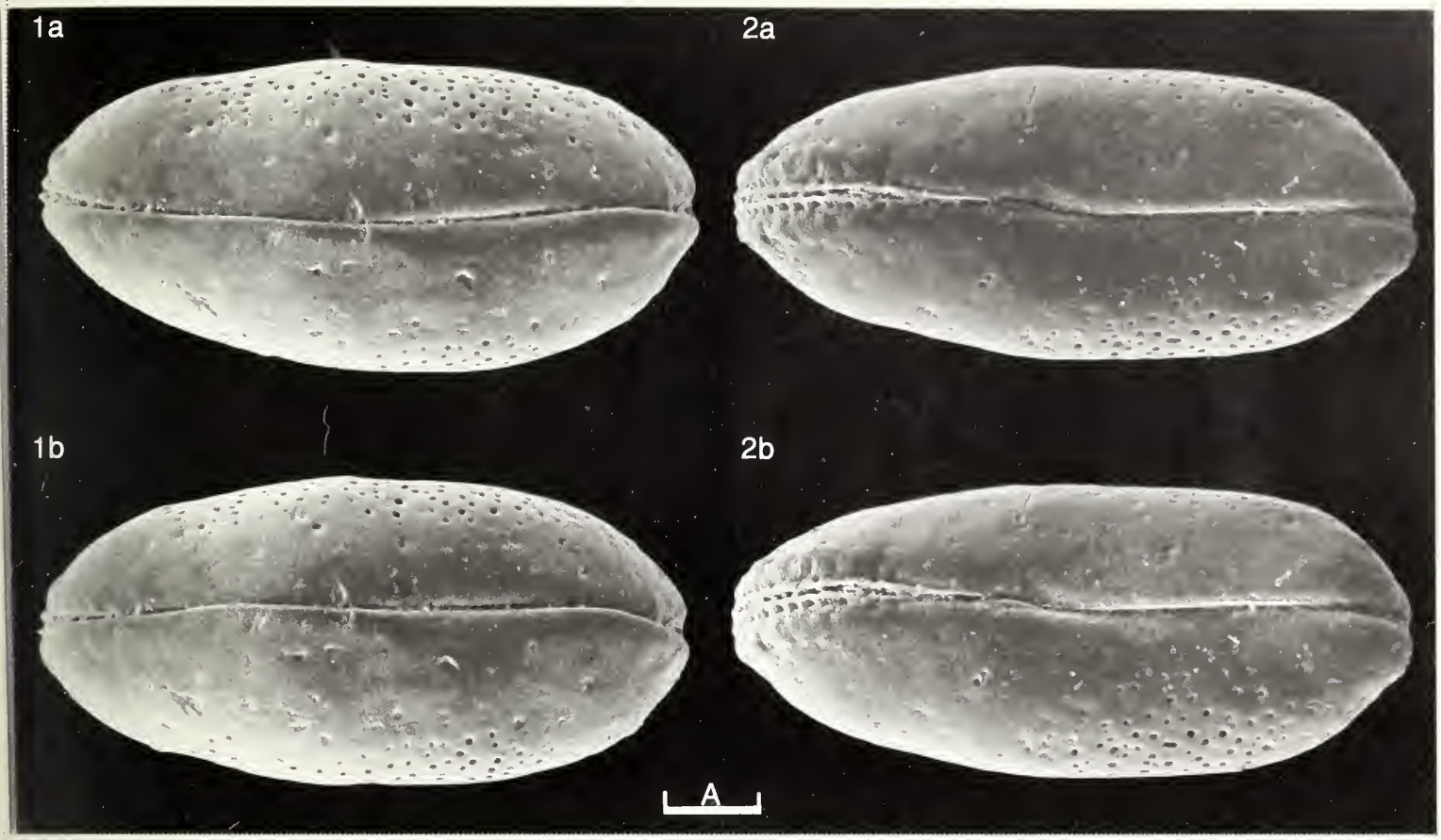
(B)

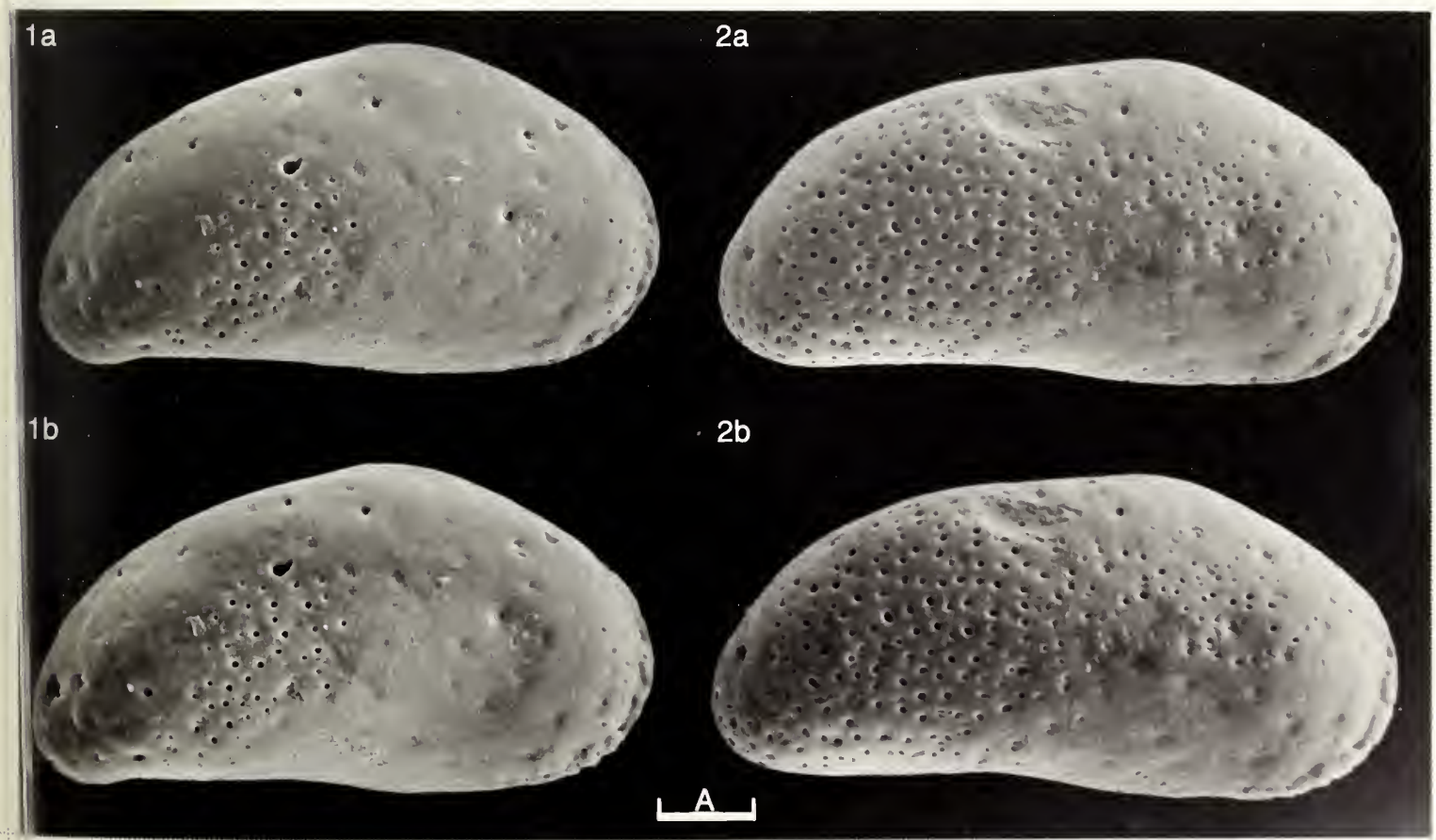
Sex	N	L (μm) $\bar{x}$	L (μm) Min	L (μm) Max	W (μm) $\bar{x}$	W (μm) Min	W (μm) Max	L/W $\bar{x}$	L/W Min	L/W Max
♀♀car.	26	692	663	713	349	338	363	1.987	1.897	2.037
♂♂car.	16	745	725	775	339	325	350	2.199	2.107	2.307

Table. 1. Measurements on specimens: N = no. of specimens; $\bar{x}$ = mean; L = length; H = height; W = width; A = valves; B = carapaces.

Explanation of Plate 12, 118

Fig. 1, ♀ RV, ext. lat. (paratype, **GIK 932-1818**; 688 μm long); fig. 2, ♂ RV, ext. lat. (paratype, **GIK 932-1824**; 750 μm long). Scale A (100 μm; × 128), figs. 1, 2.


1a
2a
1b
2b
A


1a
2a
1b
2b
A

Diagnosis: In dorsal view carapace elongate ovate, anterior end with slightly projecting lip in each valve, posterior end slightly indented at the line of junction of the valves; subtrapezoidal (male) or subtriangular (female) in lateral view, anterior end obliquely rounded, dorsal margin straight to slightly convex. Posterior end narrowly rounded posteroventrally, ventral margin in left valve almost straight, in right valve concave in posterior half. Left valve larger, overlapping the right valve almost along the entire periphery, except parts of ventral margin (in front of the middle and at the posterior end) where the right valve overlaps the left. Surface finely pitted. Anteriorly and posteroventrally vestibules are present.

Remarks: Sexual dimorphism pronounced, the males being lower, more elongate and in dorsal view narrower. The hinge of each valve is divided into three parts. The terminal parts are dentate plates with strong bifid teeth (right valve) or loculate sockets (left valve); the median part of the left valve is a groove provided with toothlets, complemented by a loculate bar in the right valve.

The central muscle scars consist of a somewhat oblique row of four adductor muscle scars, a well-developed fulcral point and a frontal scar which is split into a larger posterior and a smaller anterior part. The frontal scar occasionally shows a tendency to become T-shaped. There are also two mandibular scars: the upper scar is more elongate and larger than the lower one.

Normal pores are numerous, scattered, and of the sieve-type. The setal perforation of the sieve-plates is eccentric. The total number of perforations within each sieve-plate seems to be considerably smaller than in modern species of *Sarsicytheridea* (see Rosenfeld, *Meyniana*, Kiel, **29**, pl. 4, figs. 53b, 57b, 1977). Other types of normal pore-canals were not observed (discussed in detail by Weiss 1983, *op. cit.*).

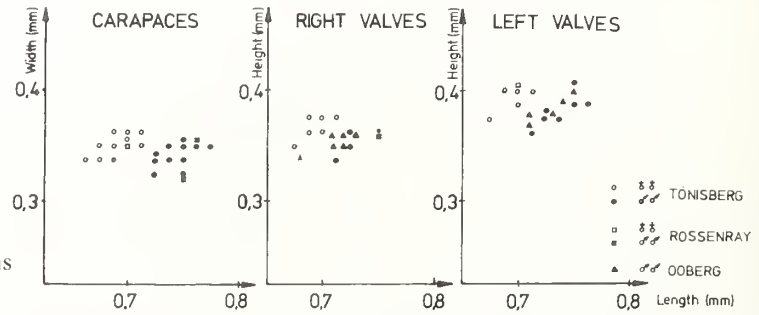
Marginal pore-canals are moderately numerous at the anterior end (approx. 25). They reach the shell surface distally of the flange in two parallel lines. A lip is developed around each opening of the first row of marginal pore-canals. In the second row two types of marginal pore-canals are present: simple ones and those with sieve-plates.

Explanation of Plate 12, 120

Fig. 1, ♀ RV, int. lat. (paratype, **GIK 932-1816**; 700 μm long); fig. 2, ♂ RV, int. lat. (paratype, **GIK 932-1822**; 725 μm long). Pl. **12**, 120, fig. 1 and Pl. **12**, 122, fig. 1 represent both valves of a single carapace.
Scale A (100 μm; × 127), figs. 1, 2.

Remarks (contd.): *S. curvata* from the Lienenklaus' collection at Göttingen and specimens from type locality (Wiepke) and type horizon (Upper Oligocene), as well as from Rossenray and Höllkopf were loaned for comparison. *S. kempfi* differs from *S. curvata* (Lienenklaus, 1900) (*Z. dt. geol. Ges.*, **52**, 528, pl. 21, fig. 2) in being smaller and showing a different distribution pattern of normal pore-canals. Furthermore, differences are observable in dorsal and lateral outline.

Associated fauna includes *Sarsicytheridea lienenklausi* (Kuiper), *Cytheridea muelleri muelleri* (v. Münster), *C. muelleri toenisbergensis* Weiss, *C. pernota* Oertli & Keij, *Schizocythere buendensis* Triebel, *Cytheretta jurinei* v. Münster, *C. semipunctata* (Bornemann), *C. (Flexus) plicata* v. Münster, *Cuneocythere marginata* (Bosquet), *C. truncata* Lienenklaus, *Schuleridea (Aequacytheridea) oculata* Moos, etc.



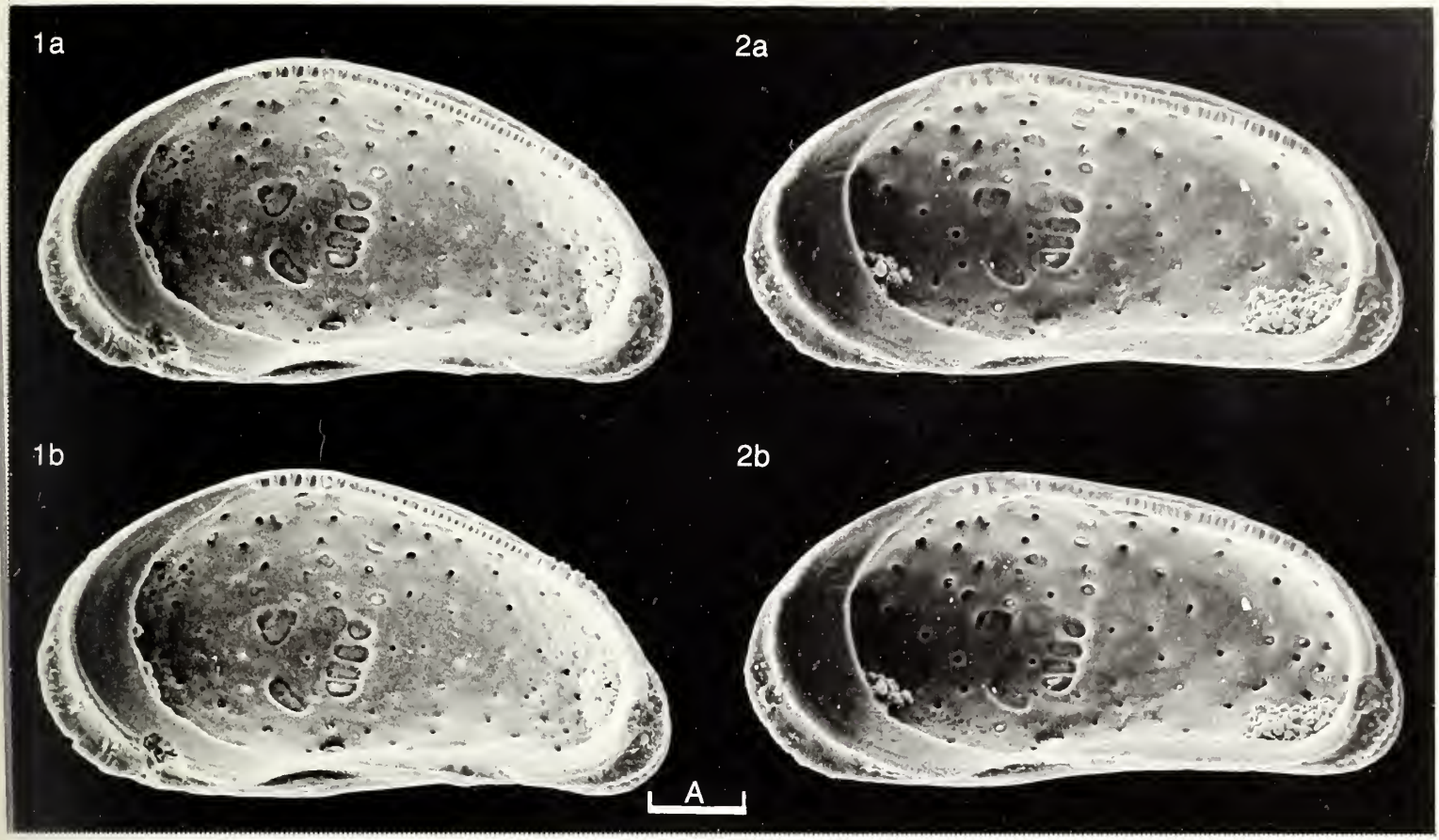
Text-fig. 1. Size distribution of adult specimens of *Sarsicytheridea kempfi* sp. nov.

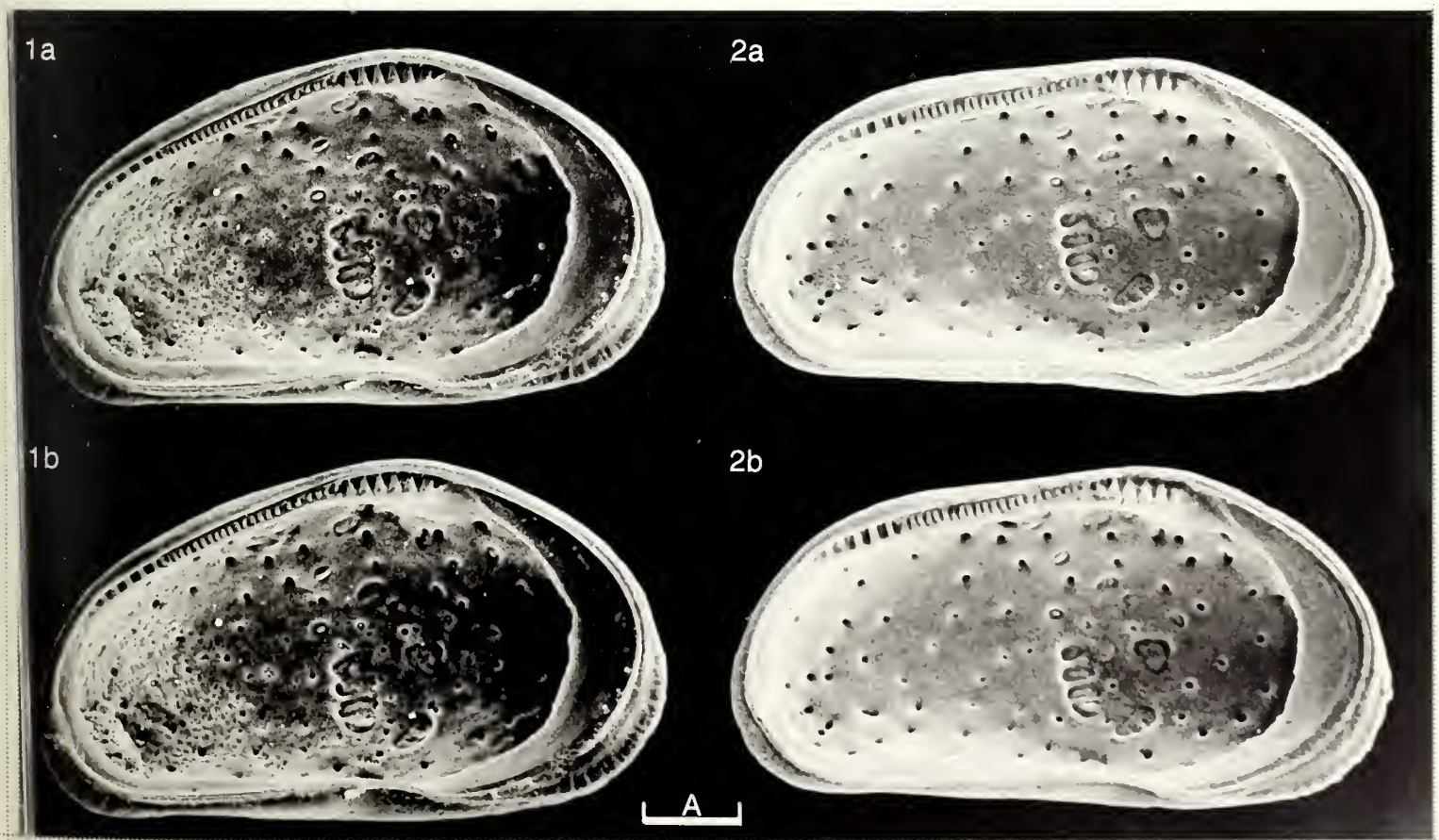
Distribution: Upper Oligocene: Shaft Rossenray, Lower Rhine Basin, Germany (Goerlich 1958, van den Bold 1963, *op. cit.*); Höllkopf near Glimmerode, Kassel Basin, Germany (Faupel 1975, *op. cit.*); Shaft Tönisberg, Lower Rhine Basin, Germany (Weiss 1983, *op. cit.*); Doberg, Germany.

Acknowledgement: Thanks are due to the Deutsche Forschungsgemeinschaft for providing the Cambridge Stereoscan 180.

Explanation of Plate 12, 122

Fig. 1, ♀ LV, int. lat. (paratype, **GIK 932-1817**; 700 μm long); fig. 2, ♂ LV, int. lat. (paratype, **GIK 932-1823**; 725 μm long). Pl. **12**, 120, fig. 2 and Pl. **12**, 122, fig. 2 represent both valves of a single carapace.
Scale A (100 μm; × 127), figs. 1, 2.


1a
2a
1b
2b
A


1a
2a
1b
2b
A

593.337.14 (118.13) (549 : 161.070.32-33 + 161.071.31 + 161.072.32-33 + 161.073.32) : 551.351 + 552.52 + 54

ON *POKORNYELLA MERSONDAVIESI* (LATHAM)

by John W. Neale
(University of Hull, England)

Pokornyella mersondaviesi (Latham, 1938)

1938 *Cythereis mersondaviesi* sp. nov. M. Latham, *Trans. R. Soc. Edin.*, **58**, 43, 44, figs. 7A-D.

Lectotype: British Museum (Nat. Hist.) coll. no. **In. 37129** (left) car.

Latham designated as holotype a form figured as a right valve and registered as **In. 37129**. Latham's figure shows a left external view not a right valve although from the figure it is not possible to say whether this is a left valve or merely the left side of a complete carapace. This raises particular problems since the type slide contains only two carapaces. The one selected here as lectotype is the one closest to Latham's figure and may well be her actual specimen.

Type locality: "Ranikot Bed, India". The paper is little more informative than the original label. The species is recorded from four localities, namely the Salt Range, Punjab, and the Attock, Kohat and Waziristan Districts, all of which are now in Pakistan.

Figured specimens: British Museum (Nat. Hist.) coll. no. **In. 37129** (lectotype, car.: Pl. **12**, 124, figs. 1, 2; Pl. **12**, 126, figs. 1, 2) from Ranikot Bed, India (now Pakistan). Palaeocene.

Remarks: The only single valve available for study was filled with matrix which obscured the internal features and details of the marginal areas. Latham, herself, described the most striking feature of the ornamentation as pits arranged in lines which appear to radiate from the centre of the valve. This is reminiscent of some species of *Hornibrookella*, a genus well known in the early Tertiary rocks of Pakistan (Siddiqui, *Bull. Brit. Mus. (N.H.) Geol. Suppl.*, **9**, 1971) and Saudi Arabia (Al-Furaih,

Explanation of Plate 12, 124

Figs. 1, 2, car. (lectotype, **In. 37129**, 890μm long): fig. 1, ext. lt. lat.; fig. 2, ext. rt. lat.
Scale A (200μm; $\times$91), figs. 1, 2.

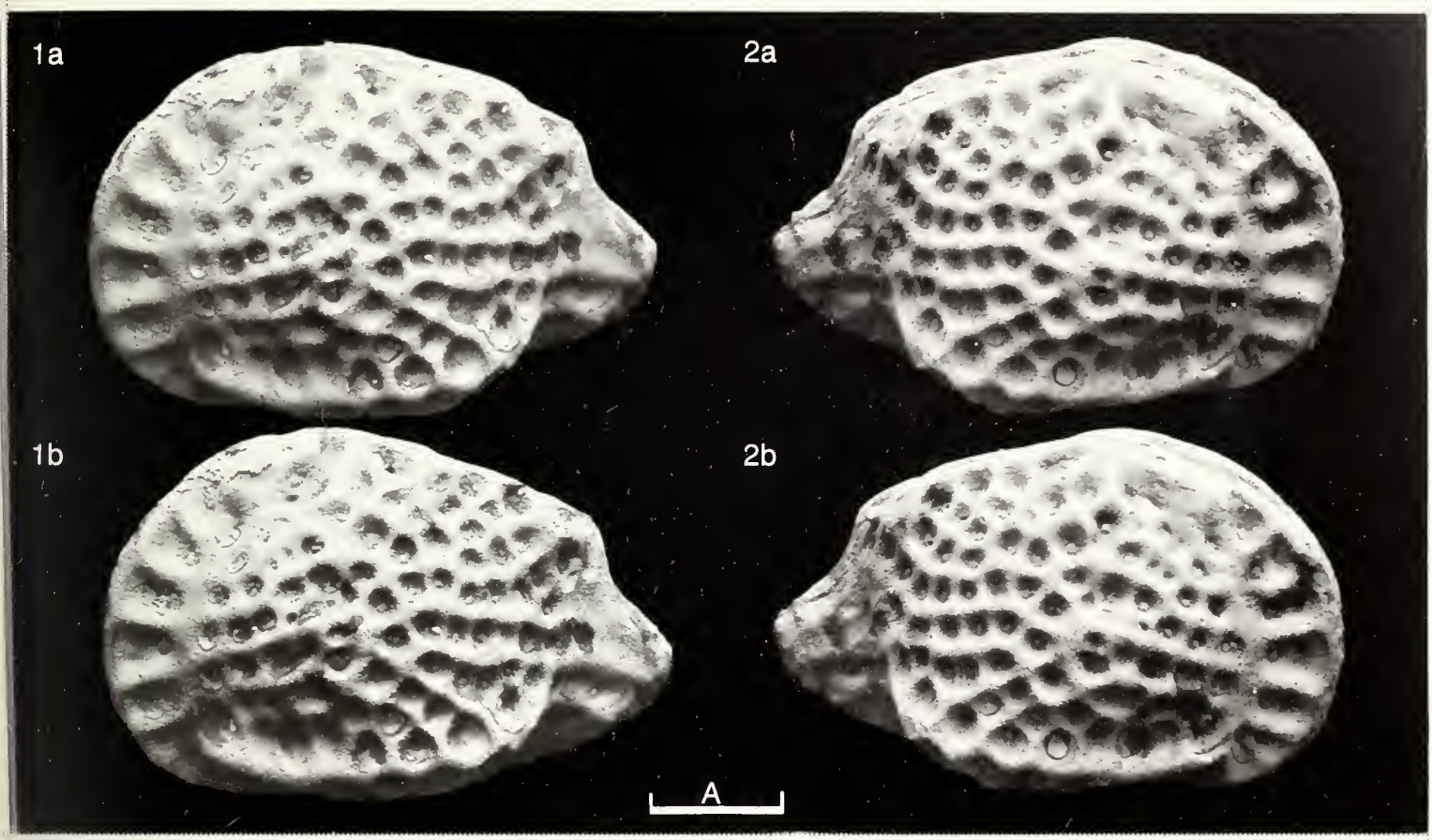
Remarks (contd.): *Palaeontology* **20**, 483 et seq., 1977). However, resemblences are superficial and the differences in the postero-dorsal part of the shell, amongst other things, are too great to assign it to this group. There is no doubt that Latham's species is an early member of the Aurilini Puri, 1973. It is not close to *Aurila* or *Mutilus* but in some ways is comparable with *Radimella*, although it differs in the nature of the marginal row of pits developed anteriorly and in the nature of the prae-ocular and anterior subdorsal areas (see Pokorny, *Acta Univ. Carolinae Geol.*, **4**, 359 et seq., 1968). Less elongate than the Upper Cretaceous *Parapokornyella* Babinot, 1980 (*Thèse Univ. Provence* **1**, 204) it differs also in the symmetrical development of the postero-dorsal region in both valves and lacks the characteristic oreillette of the left valve. It is closest to *Pokornyella* in which it is here accommodated and may be regarded as an early representative of the genus. It agrees with the Oligocene type-species in most respects (see Oertli, *Schweiz. Pal. Abhandl.* **74**, 1956) except for details of ornamentation and the greater accentuation of the ventral ridge, although comparable developments of the latter are seen in other species of *Pokornyella* from the Upper Miocene of Italy figured by Ruggieri, Russo and Bossio (*Boll. Soc. Pal. Ital.* **16**, 129 et seq.) and the Palaeogene of France (Ducasse & Coustillas, *Bull. Inst. Géol. Bass. Aquitaine*, **29**, 5 et seq., 1981).

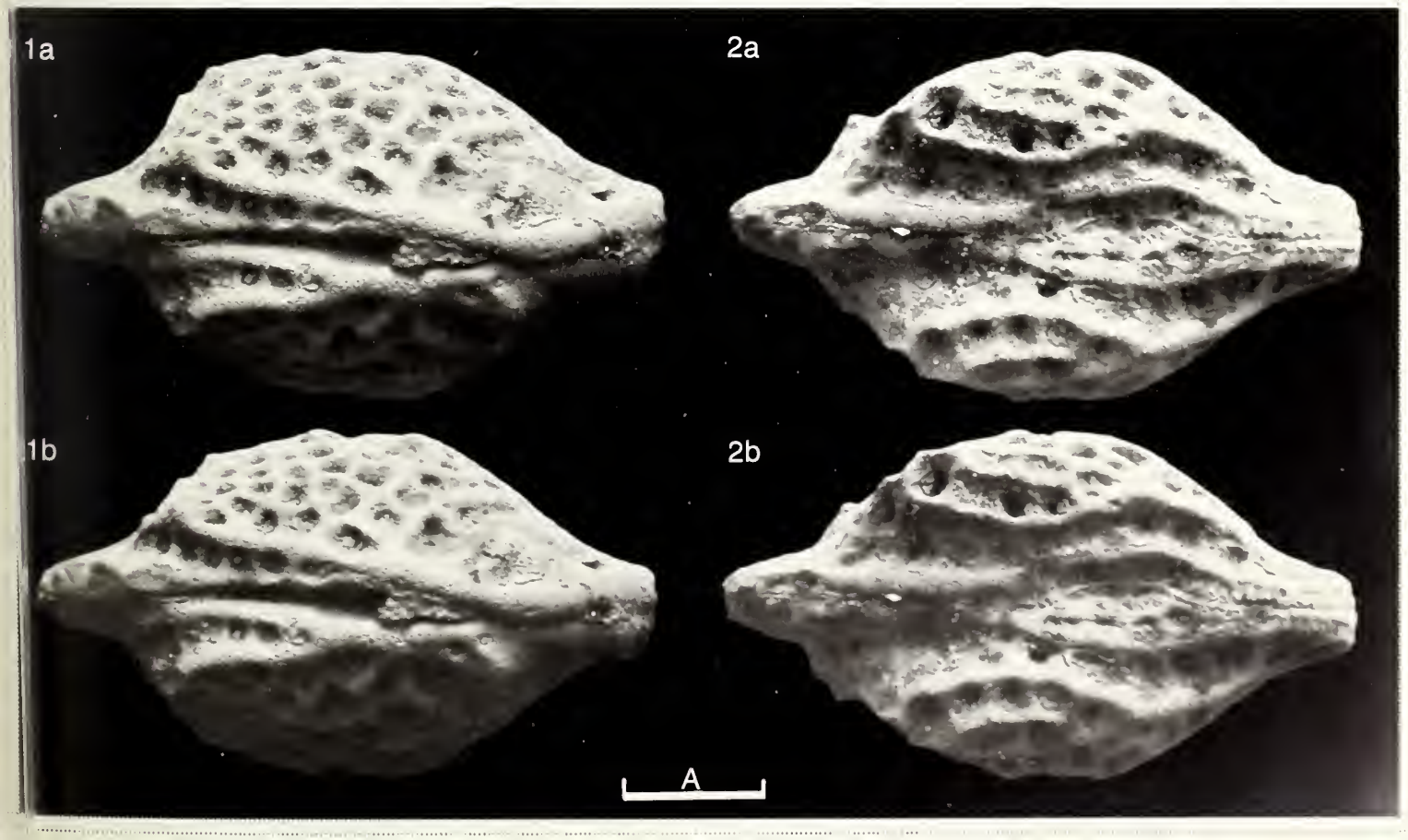
Surprisingly, *P. mersondaviesi* has not been recorded since Latham first described it in 1938, even though extensive work has been carried out on the Tertiary of the Indian sub-continent since then. She lists it at six localities/horizons in the Salt Range, four in the Attock District, two in the Kohat District and three in Waziristan and reference should be made to her paper for further details. She notes that approximately two-thirds of her collection consisted of *"Bairdia subdeltoidea"* (most of her specimens were placed in European species) and other associates of *P. mersondaviesi* were forms that we would now place in the genera *Acanthocythereis* and *Uroleberis* together with others as yet not determined but which she included under *Bythocypris, Cythere, Cythereis* and *Cytheridea*.

Acknowledgement: I am greatly indebted to the British Museum (Nat. Hist.) who kindly provided the S.E.M. photographs of Latham's material which are figured here (the specimen was photographed uncoated in the Environmental Chamber because it is one of only two specimens available).

Explanation of Plate 12, 126

Figs. 1, 2, car. (lectotype, **In. 37129**, 890μm long): fig. 1, ext. dors.; fig. 2, ext. vent.
Scale A (200μm; $\times$102), figs. 1, 2.


1a
2a
1b
2b
A


1a
2a
1b
2b
A

595.337.12 (119.9) (540 : 161.079.21) : 551.312

ON *HEMICYPRIS DENTATOMARGINATA* (BAIRD)

by Koen Martens & Karel Wouters
(Rijksuniversiteit Gent, Ghent & Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels, Belgium)

Hemicypris dentatomarginata (Baird, 1859)

1859 *Cypris dentato-marginata* sp. nov. W. Baird, *Proc. zool. Soc. Lond.*, **27**, 233, 234, pl. 63, figs. 5, 5a-c.
non 1889 *Cyprinotus dentatomarginatus* (Baird); G. O. Sars, *Forh. Vidensk. Selsk. Krist.*, **1889**, 6-24, pl. 1, figs. 1-4, pl. 3, figs. 1-11, pl. 4, figs. 1-14.
non 1898 *Cyprinotus dentatomarginatus* (Baird); E. Daday, *Természetr. Füz.*, **21**, 69.
non 1902 *Cyprinotus dentatomarginatus* (Baird); G. S. Brady, *Trans. zool. Soc. Lond.*, **16**, 196, pl. 23, figs. 6, 7.
1912 *Cyprinotus marginato-dentatus* (Baird); G. W. Müller, *Das Tierreich*, **31**, *Ostracoda*, 168, Berlin.
non 1919 *Cyprinotus dentato-marginatus* (Baird); M. Henry, *J. R. Soc. N.S.W.*, **53**, 43.
? 1921 *Cyprinotus dentatomarginatus* (Baird); R. Gurney, *J. Bombay nat. Hist. Soc.*, **27**, 843.
non 1923 *Cyprinotus dentato-marginata* (Baird); M. Henry, *Proc. Linn. Soc. N.S.W.*, **48**, 278.
non 1959 *Heterocypris dentatomarginata* sp. nov., R. Kiss.; *Revue Zool. Bot. afr.*, **59**, 83-87, figs. 1-15.
non 1961 *Heterocypris dentato-marginata* (Sars); H. Löffler, *Int. Revue ges. Hydrobiol.*, **46** (3), 378.
1972 *Hemicypris dentatomarginata* (Baird); K. G. McKenzie (Ed.), *Checklist of Ostracoda recorded from the Indian subcontinent and Ceylon (1840-1971)*, 29.
non 1977 *Heterocypris dentatomarginatus* (Baird); J. W. Neale, *in*: H. Löffler & D. L. Danielopol (Eds.); *Aspects of Ecology and zoogeography of Recent and Fossil Ostracoda*, 273, 277, pl. 1, fig. 2, fig. 8.
non 1978 *Cyprinotus dentato-marginatus* (Baird); P. De Deckker & P. J. Jones, *Dept. Nat. Developm., B.M.R. Geol. Geophys.* **195**, 88.
1979 *Heterocypris dentatomarginatus* (Baird); R. Victor & C. H. Fernando, *Rec. zool. Surv. India*, **74** (2), 182, 183, fig. 136.

Explanation of Plate 12, 128

Figs. 1-3, ♀ paralectotypes: fig. 1, car., dors. (**1945.9.26.135b**, 945 μm long); fig. 2, LV, vent. (**1945.9.26.130**, 840 μm long); fig. 3, car. vent. (**1945.9.26.135c**, 998 μm long).
Scale A (300 μm; × 56), figs. 1-3.

Lectotype: Here designated. British Museum (Nat. Hist.), no. **1945.9.26.126**, ♀ LV (840 μm long) and fragments of RV stored dry; soft parts mounted in Glycerine.

[Paralectotypes: British Museum (Nat. Hist.) nos. **1945.9.26.127 – 1945.9.26.135** & **1945.9.26.135a – 1945.9.26.135c** all ♀♀].

Type locality: Pools at Nagpur, India; approx. lat. 21° 10′N, long. 79° 12′E; coll. by Rev. S. Hislop.

Figured specimens: British Museum (Nat. Hist.) nos. **1945.9.26.126** (lectotype, ♀ appendages: Text-figs. 1A-E, 2A-I), **1945.9.26.128** (paralectotype, ♀ RV: Pl. **12**, 130, fig. 3), **1945.9.26.129** (paralectotype, ♀ LV: Pl. **12**, 130, fig. 1), **1945.9.26.130** (paralectotype, ♀ LV: Pl. **12**, 128, fig. 2), **1945.9.26.134** (paralectotype, ♀ car.: Pl. **12**, 130, fig. 2), **1945.9.26.135b** (paralectotype, ♀ car.: Pl. **12**, 128, fig. 1), **1945.9.26.135c** (paralectotype, ♀ car.: Pl. **12**, 128, fig. 3). All from Baird's syntypic material.

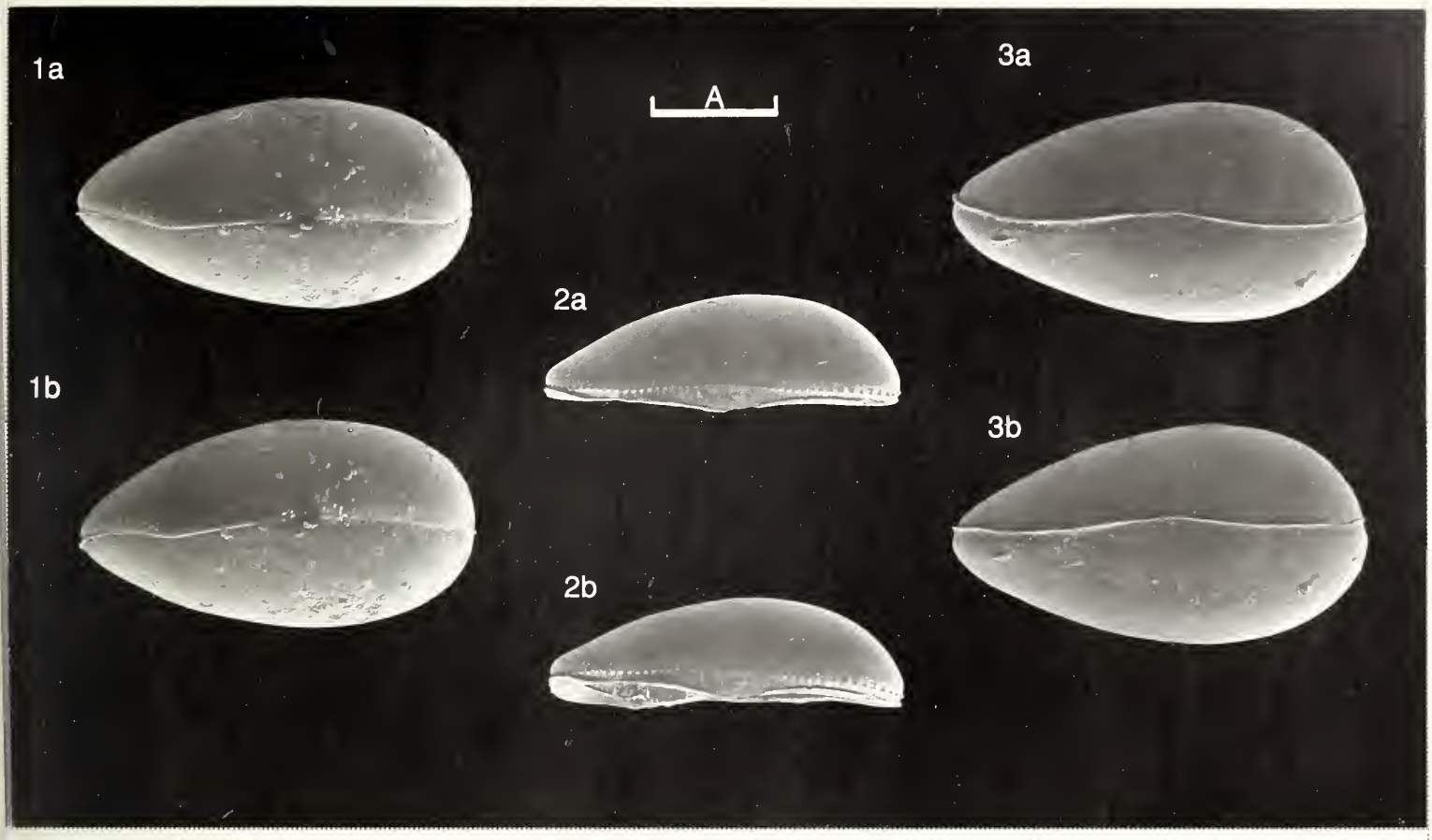
Diagnosis: Carapace in dorsal view pointed towards the anterior tip, greatest width situated between 1/2 and 3/4 of the length. Left valve with dorsal side arched, anterior and posterior sides unequally rounded; right valve with dorsal side arched and equally sloping towards frontal and caudal edges.

Natatory setae on antenna reaching beyond tips of claws by about 5% of their length; claws on third endite of maxillula smooth; mandibular palp with alpha-seta smooth and slim, beta-seta slender and set with few setulae, gamma-setae stout (length about 3 times basal width) and densely set with long setulae; posterior furcal seta about as long as posterior furcal claw.

Remarks: Since this species was described, it has been reported by various authors from different parts of the world. Unfortunately, most, if not all, of these identifications have proved erroneous. We have checked most of the above mentioned records, either from illustrations given or directly on the material itself, and found that probably six different species in two different genera have been reported as *Cyprinotus dentatomarginatus* s.l.

Explanation of Plate 12, 130

Figs. 1-3, ♀ paralectotypes: fig. 1, LV, int. lat. (**1945.9.26.129**, 875 μm long); fig. 2, car. front (**1945.9.26.134**, 858 μm long); fig. 3, RV, int. lat. (**1945.9.26.128**, 945 μm long).
Scale A (300 μm; × 56), figs. 1-3.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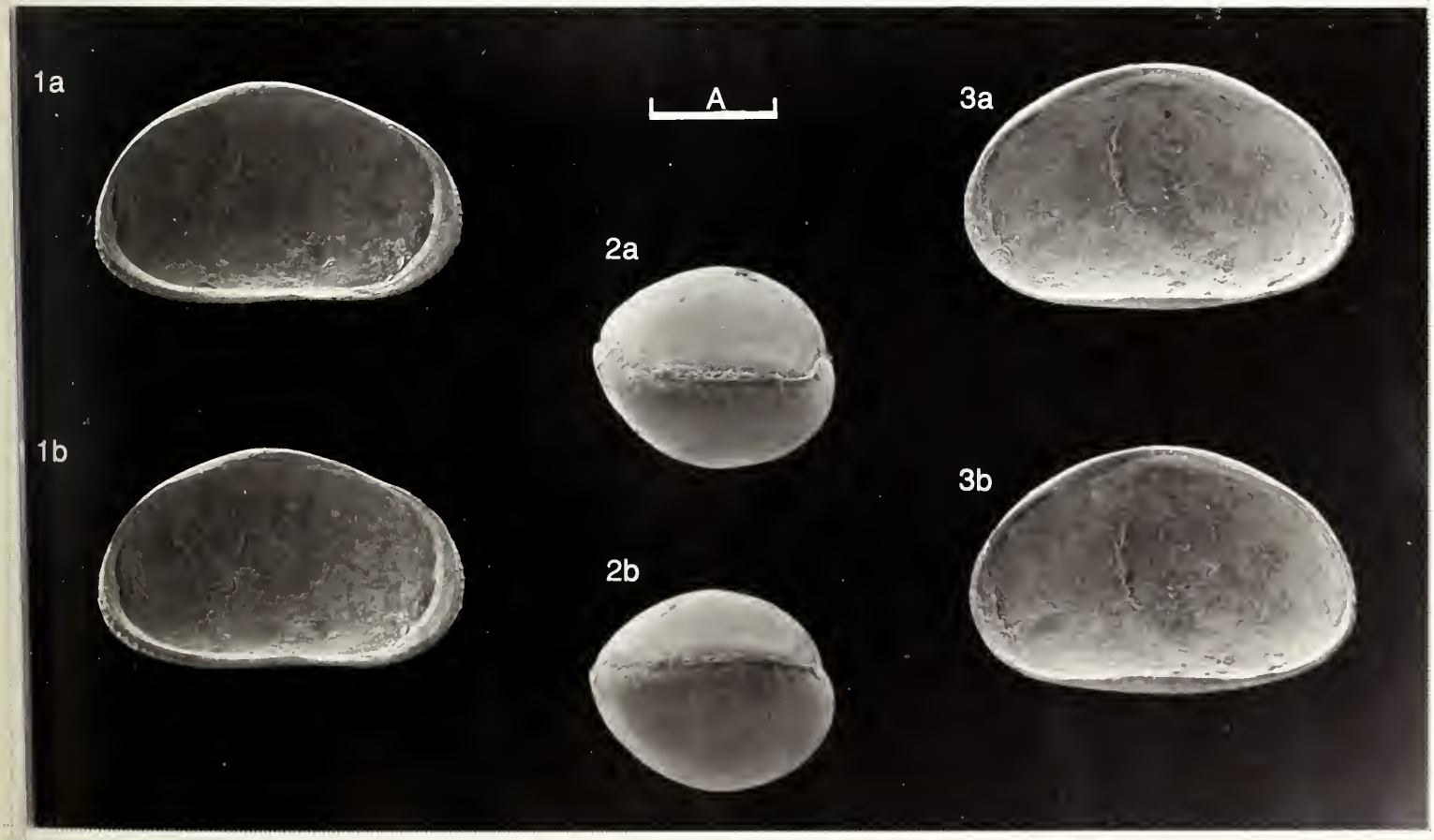
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Remarks (contd.): The first species is the one originally described by Baird (1859) as *Cypris dentato-marginata* s.s. (not *C. marginato-dentata* var., see Martens & Wouters, *Stereo-Atlas of Ostracod Shells* **12**, 135-140, 1985) and redescribed in the present paper. It was listed as a doubtful species by Müller (1912, *op. cit.*) under the name of *Cyprinotus marginato-dentatus* (Baird) and was again mentioned by McKenzie (1972, *op. cit.*) and Victor & Fernando (1979, *op. cit.*). None of the latter three citations, however, refer to new localities for this species. Gurney (1921, *op. cit.*) reported the species from Iraq. No description of these specimens was given and his material was not available to us. This record is most doubtful, but we are at present unable to refer it to another taxon.

Cyprinotus dentatomarginatus reported by Daday (1898, *op. cit.*) from Ceylon is actually *Hemicypris pyxidata* (Moniez, 1892) (one female specimen in alcohol in the Hungarian National Museum, Budapest) and the record of Brady (1902, *op. cit.*) actually concerns *Heterocypris incongruens* (large number of females in alcohol in the Zoological Museum of Copenhagen, Danmark; see also Martens, *K. Mus. mid. Afr., Zool. Dok.* **20**, 22, 1984).

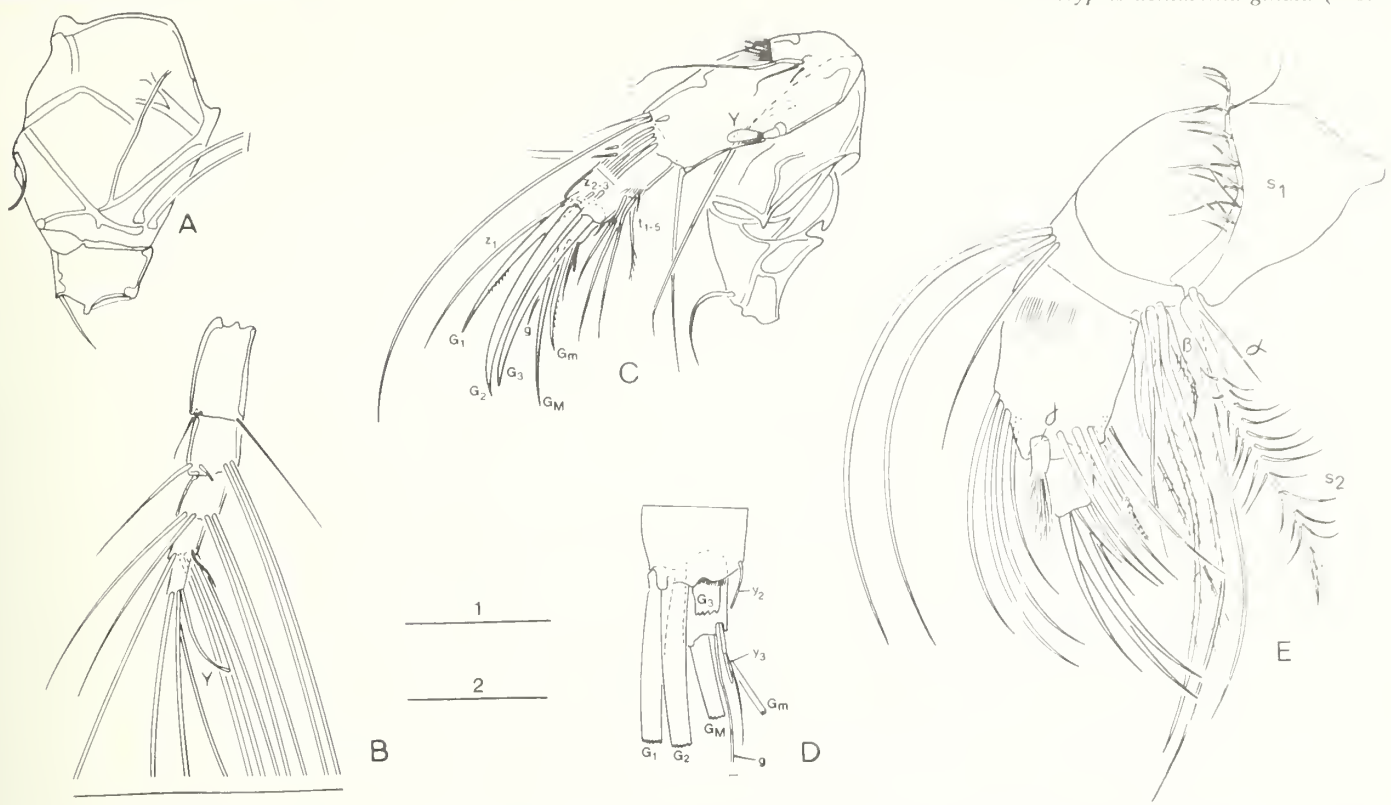
Heterocypris dentatomarginata Kiss, 1959 was renamed *Hemicypris kissi* by Martens (1984, *op. cit.*) as this African species clearly belongs in *Hemicypris* but differs from *H. dentatomarginata* s.s. (type material in Koninklijk Museum voor Midden-Afrika, Tervuren, Belgium).

Sars (1889, *op. cit.*) described specimens from Australia as *Cyprinotus dentatomarginatus* Baird. Müller (1912, *op. cit.*) listed this species as *C. dentatomarginatus* Sars and clearly distinguished it from Baird's species. Skogsberg (*Sven. Vetensk. Akad. Handl.* **52** (15), 9-22, figs. 1-31, 1917) gave an extensive redescription of this species, based on new material, and tentatively renamed it *Cypris (Cyprinotus) gregarius*. Löffler (1961, *op. cit.*), probably unaware of this, still used the name *Heterocypris dentatomarginata* (Sars) for this species and he referred Gurney's (1921) record to that taxon. Henry (1919, 1923, *op. cit.*), probably relying on Sars' (1889) description, reported the species from 2 localities in New South Wales, while De Deckker & Jones (1978, *op. cit.*) listed this species in their checklist. We propose to name the species dealt with by Sars (1889), Skogsberg (1917), Henry (1919, 1923), Löffler (1961) and De Deckker & Jones (1978) *Heterocypris gregaria* (Skogsberg). It is not impossible that this species is synonymous with *H. incongruens*, but to confirm this is beyond the scope of this paper.

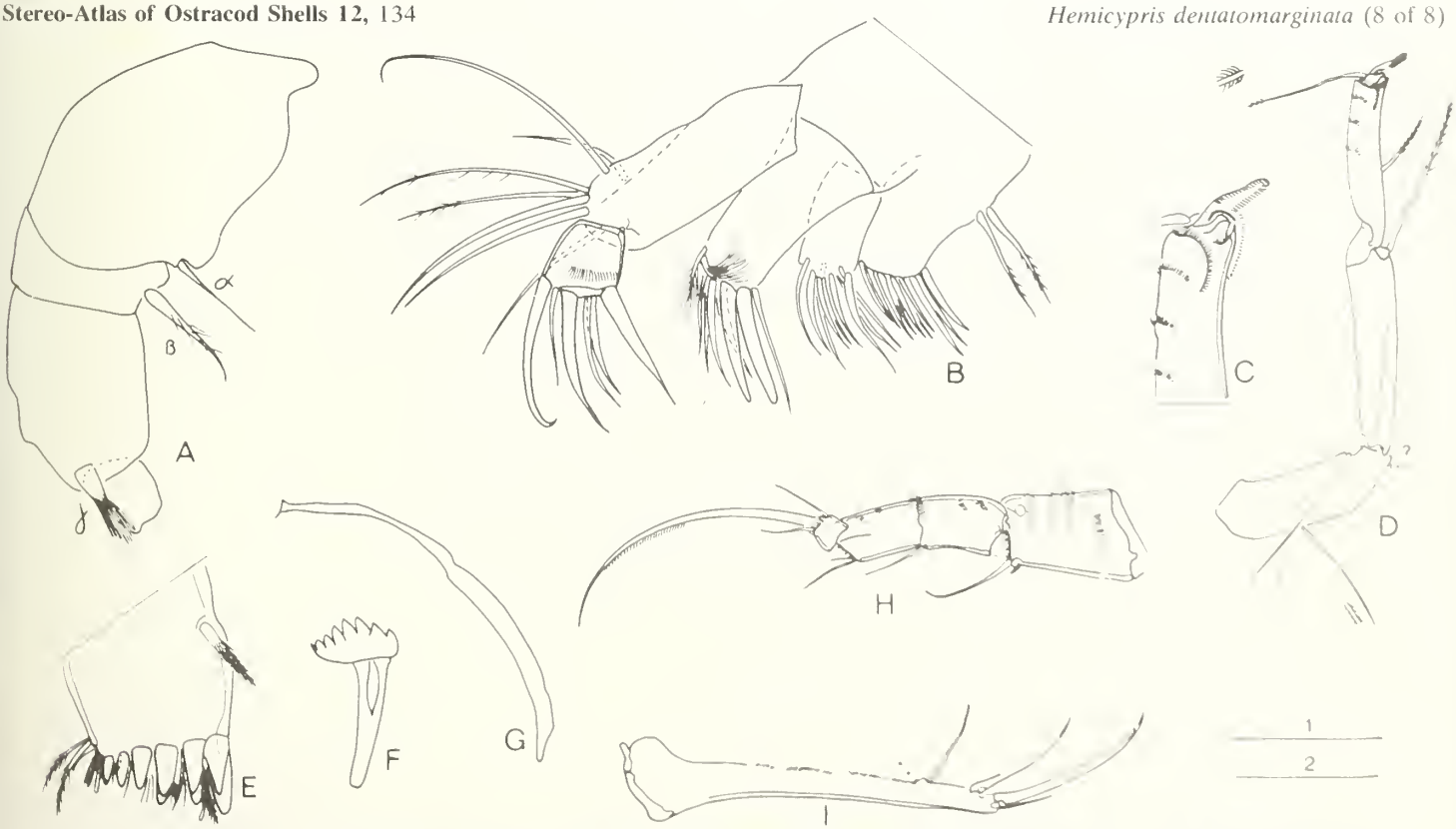
Remarks (contd.): Finally, Neale (1977; *Monograph. Biol.* **57**, 179, figs. 21, 26, 1984) recorded a species in Sri Lanka (the former Ceylon) which he named *Heterocypris dentatomarginata*. The species is in all probability new to science and therefore needs to be renamed. To facilitate comparisons, our illustrations of *H. dentatomarginata* have been printed to the same scale as those of *H. bairdi* in Martens & Wouters, 1985 (*op. cit.*).

Distribution: We can conclude that the only certain record of *Hemicypris dentatomarginata* s.s. is the type record. Whether the species still occurs in the surroundings of Nagpur is not known.

Acknowledgement: Dr. G. A. Boxshall (British Museum (Nat. Hist.)) is gratefully acknowledged for his continuous help in providing access to the type material and the type description. One of us (K.M.) is Research Assistant with the Belgian National Fund for Scientific Research.



Text-fig. 1. ♀ lectotype of *H. dentatomarginata* (no. **1945.9.26.126**): A, protopodite of antennula; B, endopodite of antennula (twisted 180° relative to position of protopodite); C, antenna; D, detail of two terminal segments of antenna, showing chaetotaxy (z-setae omitted); E, mandibular palp (respiratory plate omitted). Scales: 1 = 100 μm for A-C; 2 = 50 μm for D, E.



Text-fig. 2. ♀ lectotype of *H. dentatomarginata* (no. **1945.9.26.126**): A, mandibular palp, showing alpha, beta and gamma-setae; B, maxillula; C, detail of terminal segments of second thoracopod; D, second thoracopod; E, detail of distal part of basal podomere of mandibula; F, rake-like organ; G, furcal attachment; H, first thoracopod; I, furca. Scale: 1 = 100 μm for D, G-I; 2 = 50 μm for A-C, E, F.

595.337.12 (119.9) (540 : 161.079.21) : 551.312

ON *HEMICYPRIS BAIRDI* MARTENS & WOUTERS sp. nov.

by Koen Martens & Karel Wouters
(Rijksuniversiteit Gent, Ghent & Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels, Belgium)

Hemicypris bairdi sp. nov.

1859 *Cyprinotus marginato-dentata* var. W. Baird, *Proc. zool. Soc. Lond.*, **27**, pl. 63, figs. 5d-f.

Holotype: British Museum (Nat. Hist.) no. **1985.1**, partly dissected ♀. Valves opened and valves and appendages stored dry in a slide (originally called "syntype *Hemicypris dentatomarginata* (Baird), det. K. G. McKenzie").

[Paratypes: dissected ♀ Brit. Mus. (Nat. Hist.) nos. **1985.2 – 1985.10** + *c.* 20 specimens in the original boxes].

Type locality: Pools at Nagpur, India; approx. lat. 21° 10′N, long. 79° 12′E; coll. by Rev. S. Hislop.

Figured specimens: British Museum (Nat. Hist.) nos. **1985.2** (♀ appendages; Text-fig. 1A, F, 2C), **1985.3** (♀ appendages; Text-figs. 1B-E, 2A, B, D-G), **1985.7** (♀ RV; Pl. **12**, 138, fig. 3), **1985.8** (♀ car.; Pl. **12**, 138, fig. 2), **1985.9** (♀ car.; Pl. **12**, 136, fig. 3) (all paratypes). The specimens illustrated in Pl. **12**, 136, figs. 1, 2, Pl. **12**, 138, fig. 1, were lost during transport after SEM-photographs were taken. All were taken from the Baird collection (see *Remarks*).

Diagnosis: Valves anteriorly and posteriorly subequally rounded, both dorsal and ventral margins straight, greatest width of the carapace in dorsal view situated close to the middle.

Natatory setae on the antenna reaching with 2/5 of their length beyond tips of the claws; claws on third endite of maxillula smooth; mandibular palp with alpha-seta smooth and slim, beta-seta slender and set with few setulae and gamma-seta very stout (about as wide as long) and densely set with long setulae; posterior seta on furca longer than posterior claw.

Explanation of Plate 12, 136

Fig. 1, car. dors. (♀, specimen lost; 1014 μm long); fig. 2, LV, vent. (♀, specimen lost; 980 μm long); fig. 3, car. vent. (♀, paratype, **1985.9**; 1033 μm long).

Scale A (300 μm; × 56), figs. 1-3.

Remarks: Skogsberg (*Sven. Vetensk. Akad. Handl.*, **52** (15), 9-22, figs. 1-31, 1917) was the first to mention that Baird's *Cyprinotus marginato-dentata* var. (illustrated in figs. 5d-f of Baird *op cit.*, 1859, but never mentioned in the text) actually constitutes a species quite different from the nominate one. The type-material of *Cypris dentato-marginatus* Baird (British Museum (Nat. Hist.)) consists of 3 boxes, the first box containing 12 valves of *Hemicypris dentatomarginata* s.s. (see Martens & Wouters, *Stereo-Atlas of Ostracod Shells* **12**, 127-134, 1985), the other two boxes containing almost exclusively material of the second species, here described as *Hemicypris bairdi* sp. nov. Upon comparing material of both species (dried appendages were soaked in a polyphosphate detergent), it appears that *H. bairdi* differs from *H. dentatomarginata* in the following features: the latter species is somewhat smaller than the former, has an arched dorsal margin (nearly straight in *H. bairdi*), its greatest width is situated at about 3/4 of its length (close to the centre in *H. bairdi*), while the morphology of the alpha, beta and mainly the width-length ratio of the gamma-setae on the mandibular palp also differ to some extent. Other apparent differences concern the number of claws and setae on the mandibular palp and on the antennae, but hairs can easily have been broken in either of the investigated specimens as the appendages have been dry for 125 years.

H. bairdi sp. nov. has been compared to the following known Indian *Hemicypris* species: *H. anomala* (Klie, 1938); *H. derweshensis* Battish, 1981; *H. dissonus* Victor & Fernando, 1976; *H. falcata* Victor & Fernando, 1976; *H. malerkotlaensis* Battish, 1981; *H. megalops* Sars, 1903; *H. ovata* Sars, 1903; *H. pailensis* Battish, 1981 and *H. pyxidata* (Moniez, 1892). The new species differs from these and other species in the genus mainly by the shape of the valves and by the morphology of the gamma-seta on the mandibular palp.

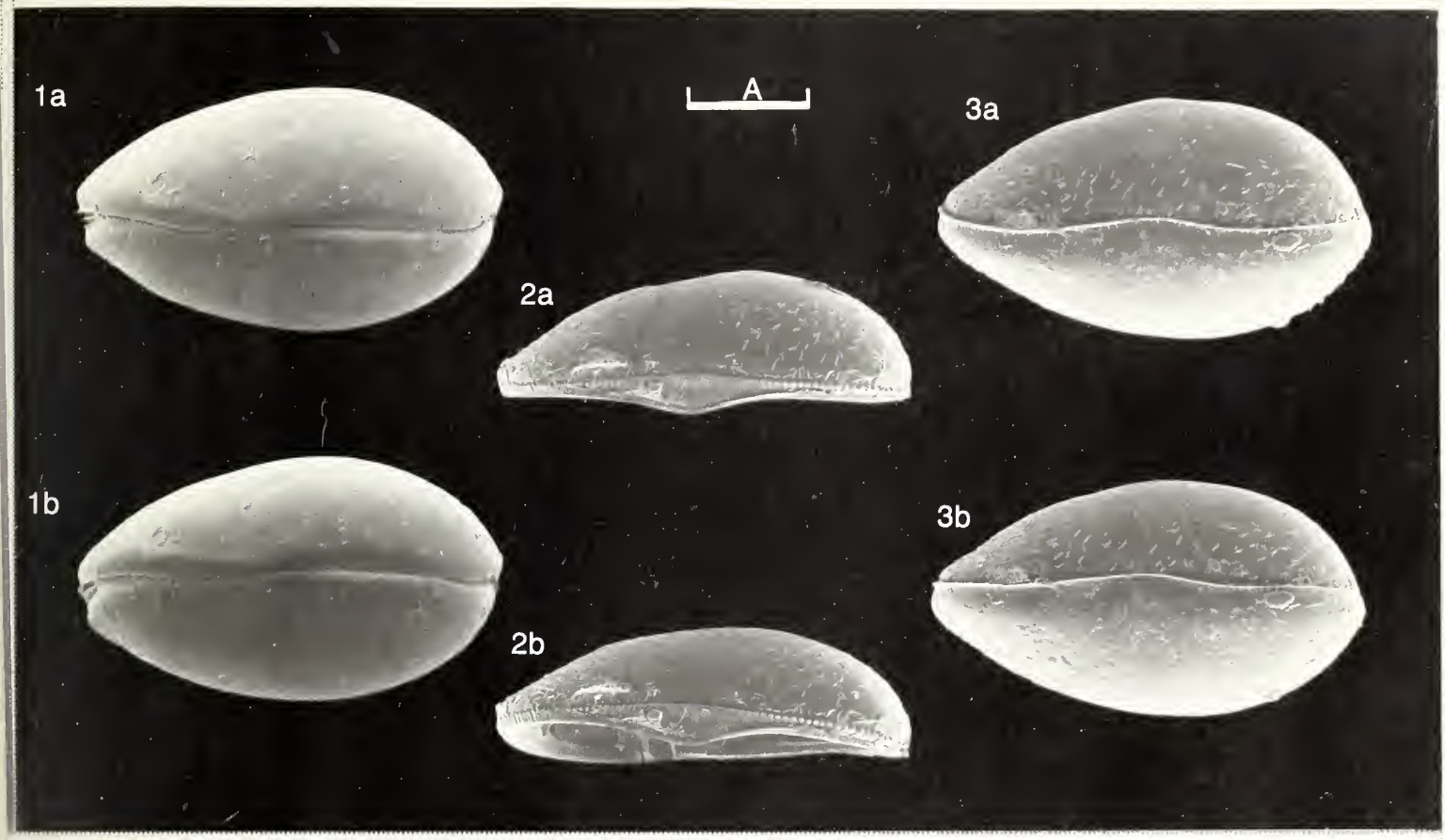
Distribution: So far known only from the type locality.

Acknowledgment: Dr. G. A. Boxshall (British Museum (Nat. Hist.)) is gratefully acknowledged for his continuous help in providing access to the original Baird material. One of us (K.M.) is Research Assistant with the Belgian National Fund for Scientific Research.

Explanation of Plate 12, 138

Fig. 1, LV, int. lat. (♀, specimen lost; 980 μm long); fig. 2, car., left lat. (♀, paratype, **1985.8**; 1014 μm long); fig. 3, RV, int. lat. (♀, paratype, **1985.7**; 997 μm long).

Scale A (300 μm; × 56), figs. 1-3.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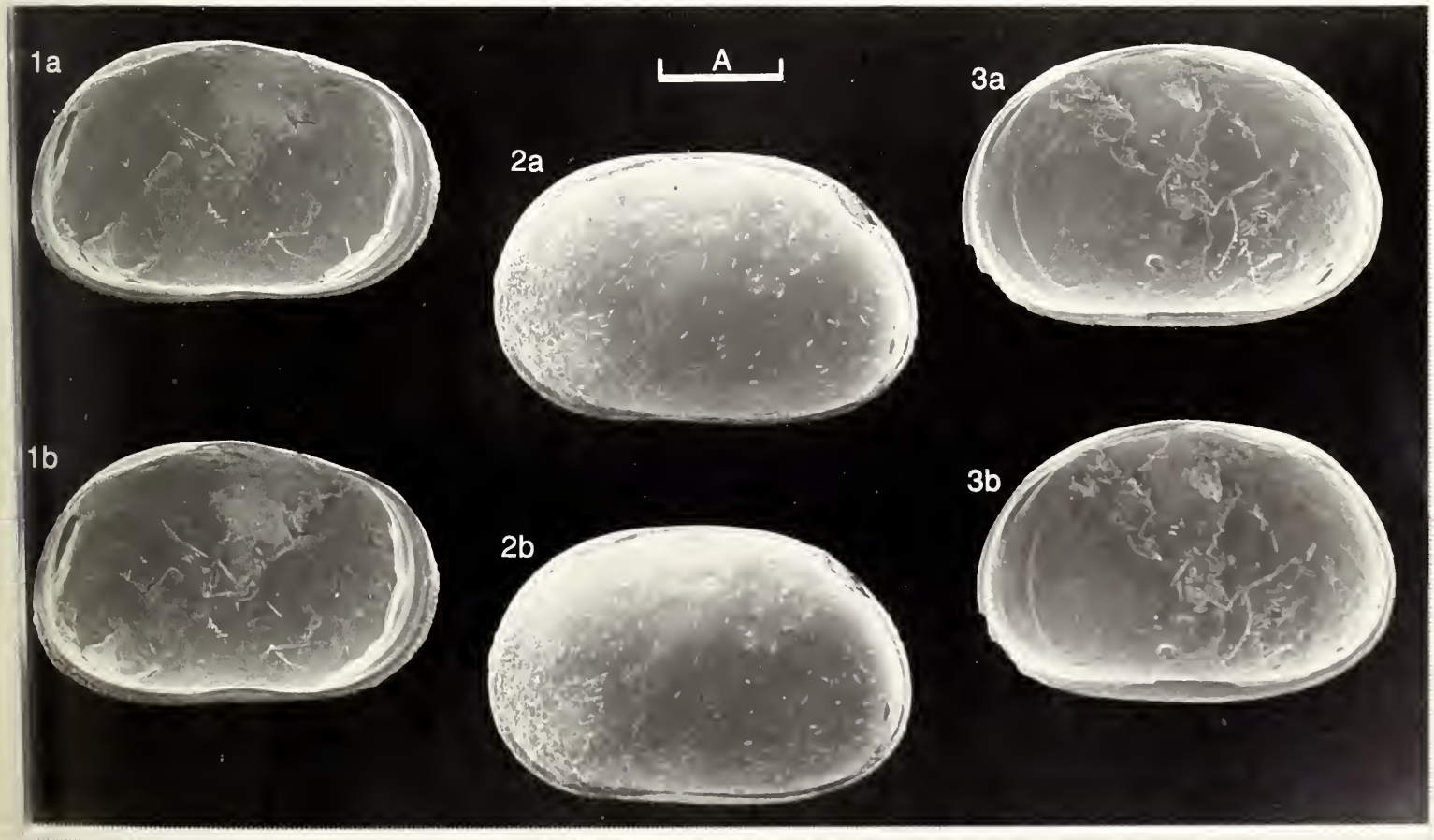
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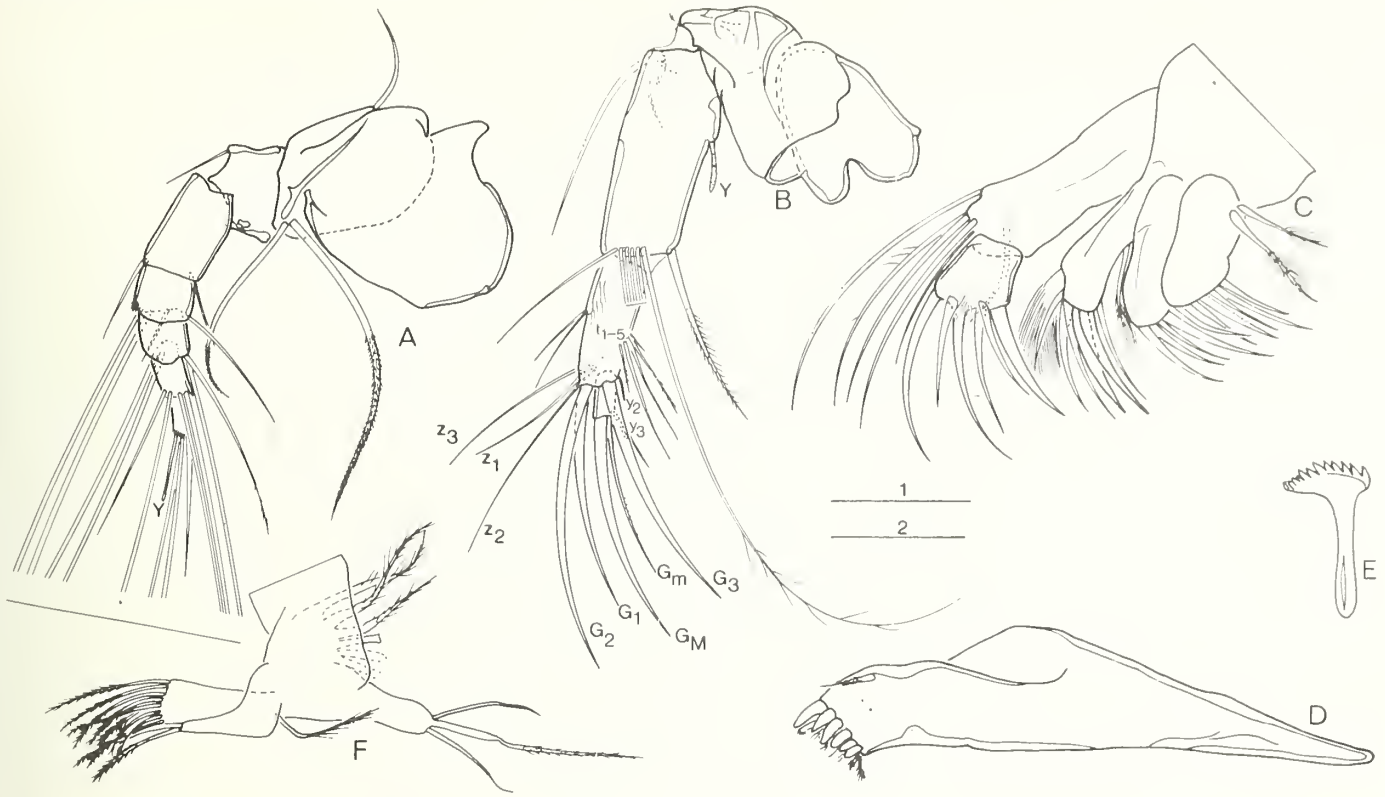
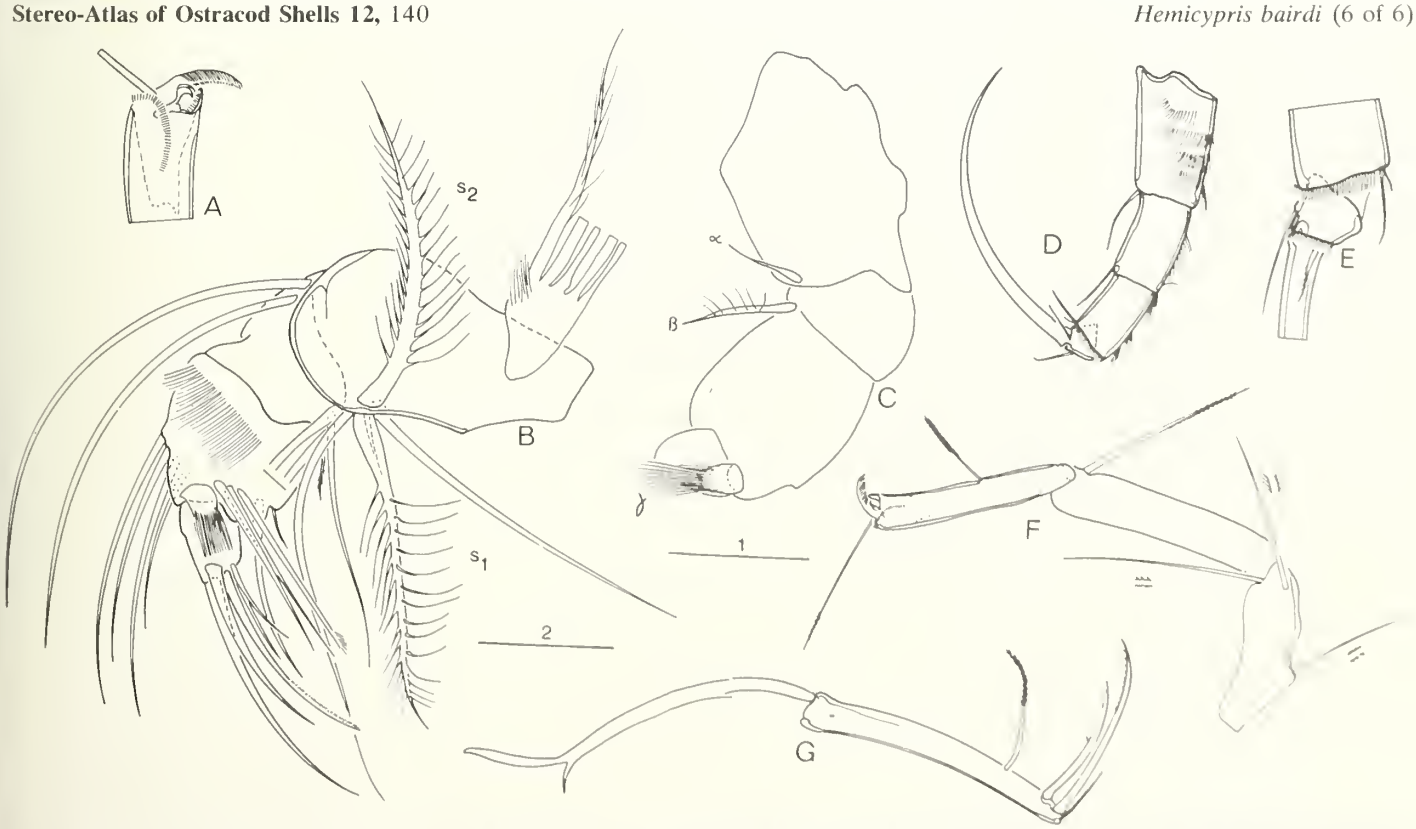


Text-fig. 1. ♀ appendages of *H. bairdi*. Paratype, **1985.2**; A, antennula; F, maxilla. Paratype, **1985.3**; B, antenna; C, maxillula; D, mandibula; E, rake-like organ. Scales: 1 = 100 μm for A, B, E, F; 2 = 50 μm for C, D.



Text-fig. 2. ♀ appendages of *H. bairdi*. Paratype, **1985.2**; C, mandibular palp showing alpha, beta and gamma-setae. Paratype, **1985.3**; A, detail of distal part of second thoracopod; B, mandibular palp; D, first thoracopod; E, detail of distal part of first thoracopod; F, second thoracopod; G, furca and furcal attachment. Scales: 1 = 100 μm for D, F, G; 2 = 50 μm for A, B, C, E.

ON *GAMBIELLA CAELATA* WITTE gen. et sp. nov.

by Leendert Witte
(University of Amsterdam, The Netherlands)

Genus *GAMBIELLA* gen. nov.

Type-species: *Gambiella caelata* sp. nov.

Derivation of name: From The Gambia, the country from where the type-species is reported.

Diagnosis: Carapace elongate, length about 2.5 times height. Anterior margin broadly rounded, posterior margin with a bluntly pointed, laterally compressed caudal process. The depressed area of this process extends forward along the ventral margin of the shell to approximately mid-length. Valves almost equal in size. In dorsal view the compressed caudal process is distinctive. Hinge gongylodont, left valve with strong, smooth hinge bar. A subvertical row of four undivided adductor muscle scars is present. Frontal scar bipartite, consisting of a large oval scar with a small round one close in front of it.

Remarks: The hinge is very similar to those of *Heinia* Bold, 1985 and *Nipponocythere* Ishizaki, 1971, but the frontal muscle scar is different. In both those genera the caudal process, characteristic of *Gambiella*, is absent or of different shape. *Heinia* and *Nipponocythere* exhibit strong sexual dimorphism in the outline of their shell; this is not observed in the new genus.

Explanation of Plate 12, 142

Fig. 1, RV, ext. lat. (paratype, **K 6558**, 415 μm long); fig. 2, LV, ext. lat. (paratype, **K 6557**, 415 μm long).
Scale A (100 μm; × 185), figs. 1, 2.

Gambiella caelata sp. nov.

Holotype: University of Amsterdam (Geol. Inst.) coll. no. **K 6553**, LV.
[Paratypes: nos. **K 6549-6552** and **K 6554-6559**].

Type locality: Cape St. Mary, Republic of the Gambia (lat. 13° 28′N, long. 16° 47′W); Recent, marine, open beach environment; fine, glauconite-rich quartz sand.

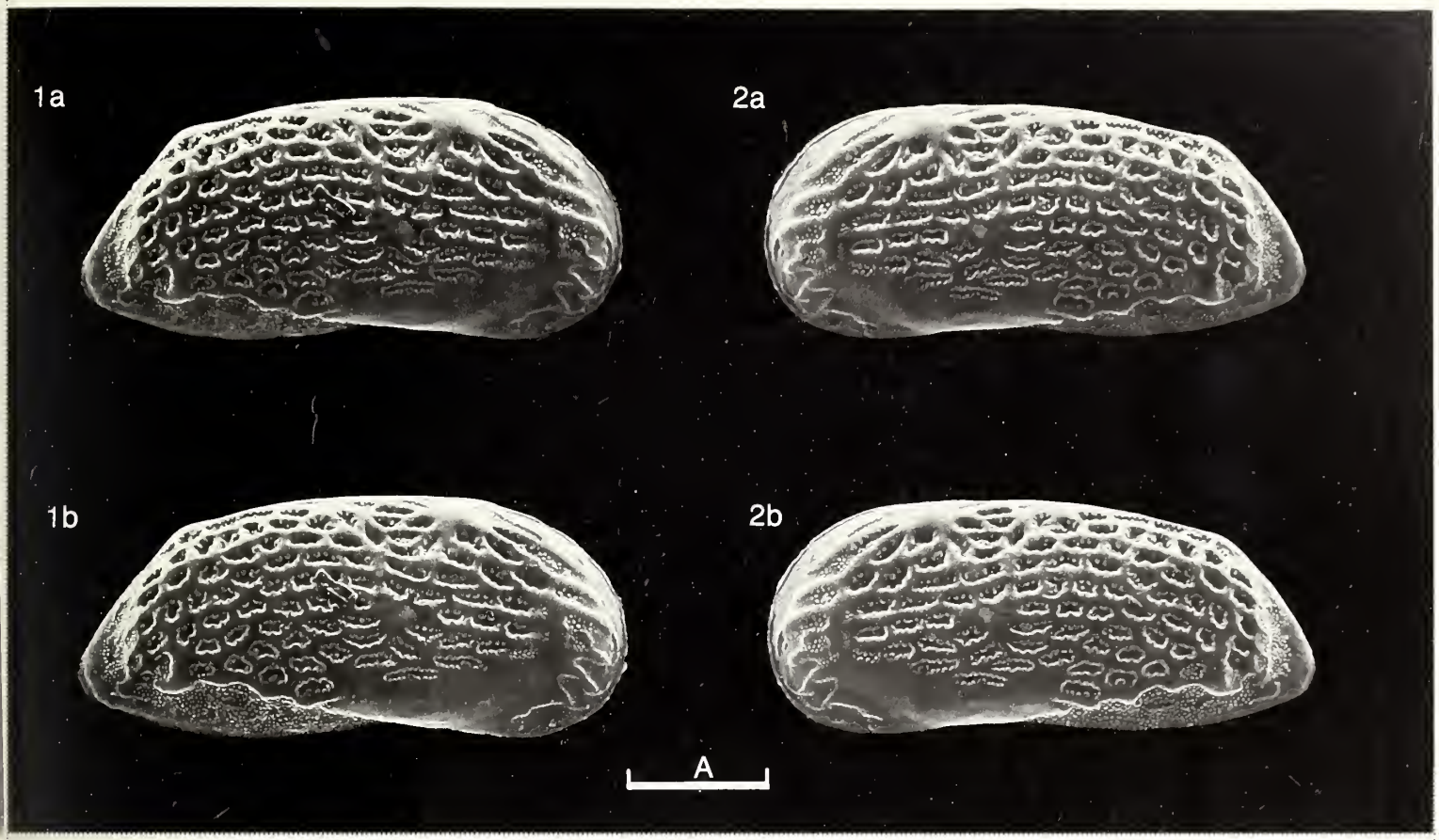
Derivation of name: Latin *caelatus*, engraved, decorated; referring to the fine ornamentation.

Figured specimens: University of Amsterdam (Geol. Inst.) coll. nos. **K 6549** (car.: Pl. **12**, 148, fig. 1), **K 6550** (car.: Pl. **12**, 148, fig. 2), **K 6553** (holotype, LV: Pl. **12**, 144, fig. 1; Pl. **12**, 146, fig. 3), **K 6554** (RV: Pl. **12**, 144, figs. 2, 3), **K 6556** (LV: Pl. **12**, 146, fig. 2), **K 6557** (LV: Pl. **12**, 142, fig. 2; Pl. **12**, 146, fig. 1), **K 6558** (RV: Pl. **12**, 142, fig. 1). All from the type locality.

Diagnosis: A densely ornamented species of *Gambiella* with longitudinally arranged oblong fossae. Ingrowing papillae edging fossae, marginal fossae with papillate sola. Caudal process finely papillate, except outer margin. Eye spot and subcentral tubercle broad and unornamented. Sexual dimorphism not apparent in outline of the shell (see *Remarks*).

Explanation of Plate 12, 144

Fig. 1, LV, dors. (holotype, **K 6553**, 420 μm long); fig. 2, 3, RV, (paratype, **K 6554**, 420 μm long); fig. 2, dors.; fig. 3, int. lat.
Scale A (100 μm; × 205), figs. 1, 2; scale B (100 μm; × 185), fig. 3.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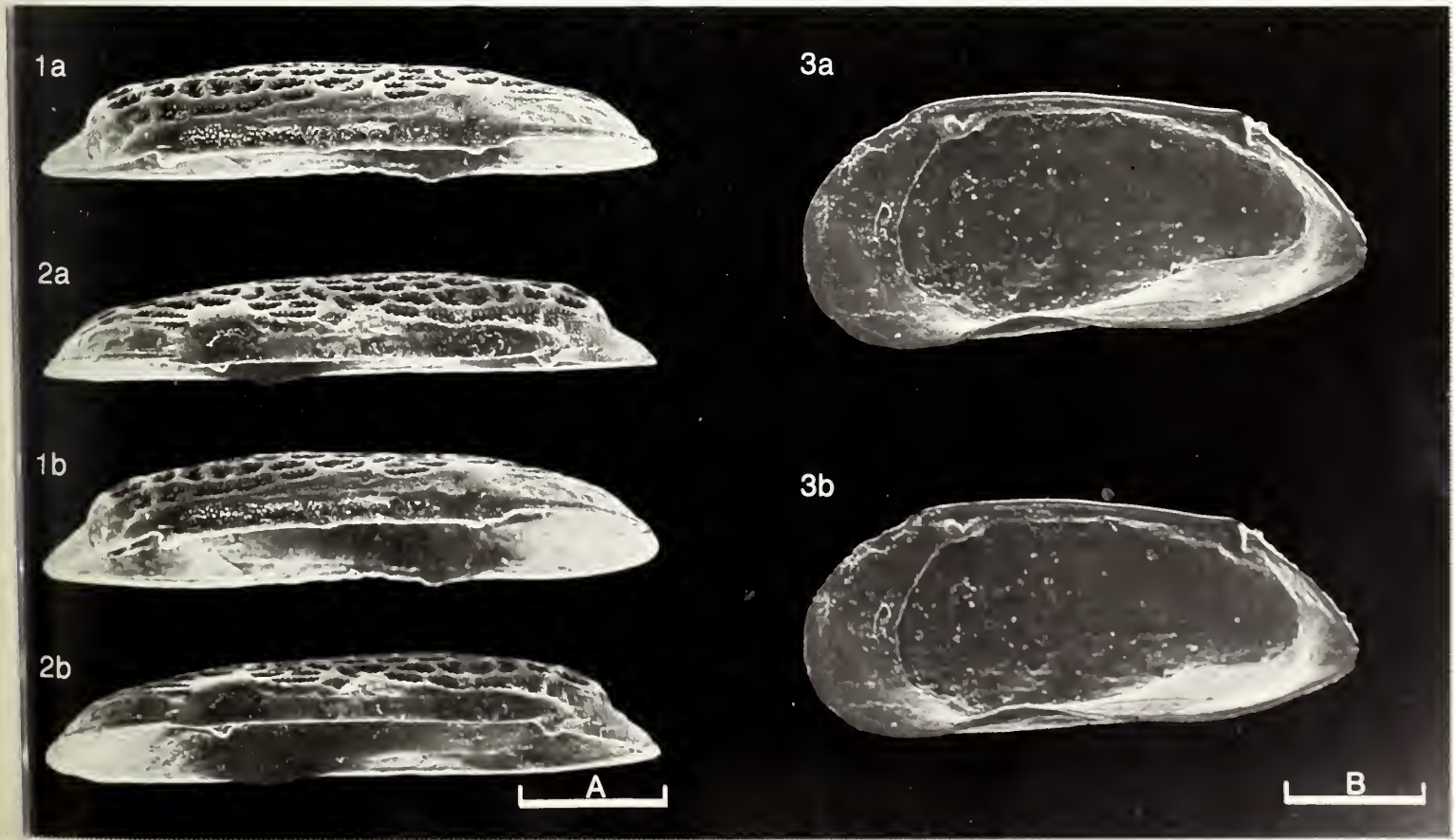
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B

Remarks: A number of forms belonging to *Gambiella* have been reported from the Pacific area. Brady (*Trans. R. Soc. Edinb.*, **35** (2), 499, pl. 2, figs. 10, 11, 1890) described *Cythere caudata* from Savusavu Bay, Fiji. It differs from the new species mainly in having a more rounded posterior margin. *Cythere* ? *caudata* Brady of Key (*Proc. K. ned. Akad. Wet.*, ser. B, **57** (3), 362, pl. 3, figs. 1a, 1b, 1954) from Manila Bay and *"Cythere" caudata* Brady of Holden (*Pacif. Sci.*, **21** (1), 45, figs. 36a-f, 1967) from the Neogene and Recent of Hawaii are similar in outline to *Gambiella caelata* but differ in the shape of the fossae. Allison & Holden (*Trans. S. Diego Soc. nat. Hist.*, **16** (7), 207, figs. 30a, 30b, 1971) reported *"Cythere"* sp. cf. *"C" caudata* Brady from Clipperton Island; this form is distinguished by its larger size and the presence of horizontal riblets. *Campylocythereis (Acuticythereis)* sp. B of Swain & Gilby (*Micropalaeontology*, **20** (3), 320, pl. 4, figs. 18, 19, 1974), from Holocene sediments off Nicaragua, is similar to *Gambiella caelata* in most respects, but has a faintly punctate ornamentation. *"Cythere"* sp. aff. *"C" caudata* Brady of Holden (*U.S. Geol. Survey Prof. Paper*, **680-F**, 36, pl. 16, figs. 8, 9, 1976), from the lower Miocene of Midway, is smooth and has a slightly different outline. All reports listed above relate to only very few specimens. At the present time it is not possible to determine the taxonomic status of these forms.

On the basis of the shape of the inner lamella two morphs can be distinguished in *Gambiella caelata*. The posterior part of the inner lamella, which is smoothly sinuous in one morph (see Pl. **12**, 144, fig. 3; Pl. **12**, 146, fig. 3), shows a noticeable protrusion in the other (Pl. **12**, 146, fig. 2, arrowed). This feature is present in 10 out of the 14 loose valves of the type sample and occurs on both valves of the carapace. As no appendages were found, the nature of this dimorphism, which may be sexual, could not be determined.

Explanation of Plate 12, 146

Fig. 1, LV, int. lat., muscle scars (paratype, **K 6557**); fig. 2, LV, int. lat., (paratype, **K 6556**, 405 μm long); fig. 3, LV, int. lat. (holotype, **K 6553**, 420 μm long).

Scale A (10 μm; $\times$1050), fig. 1; scale B (100 μm; $\times$215), fig. 2; scale C (100 μm; $\times$185), fig. 3.

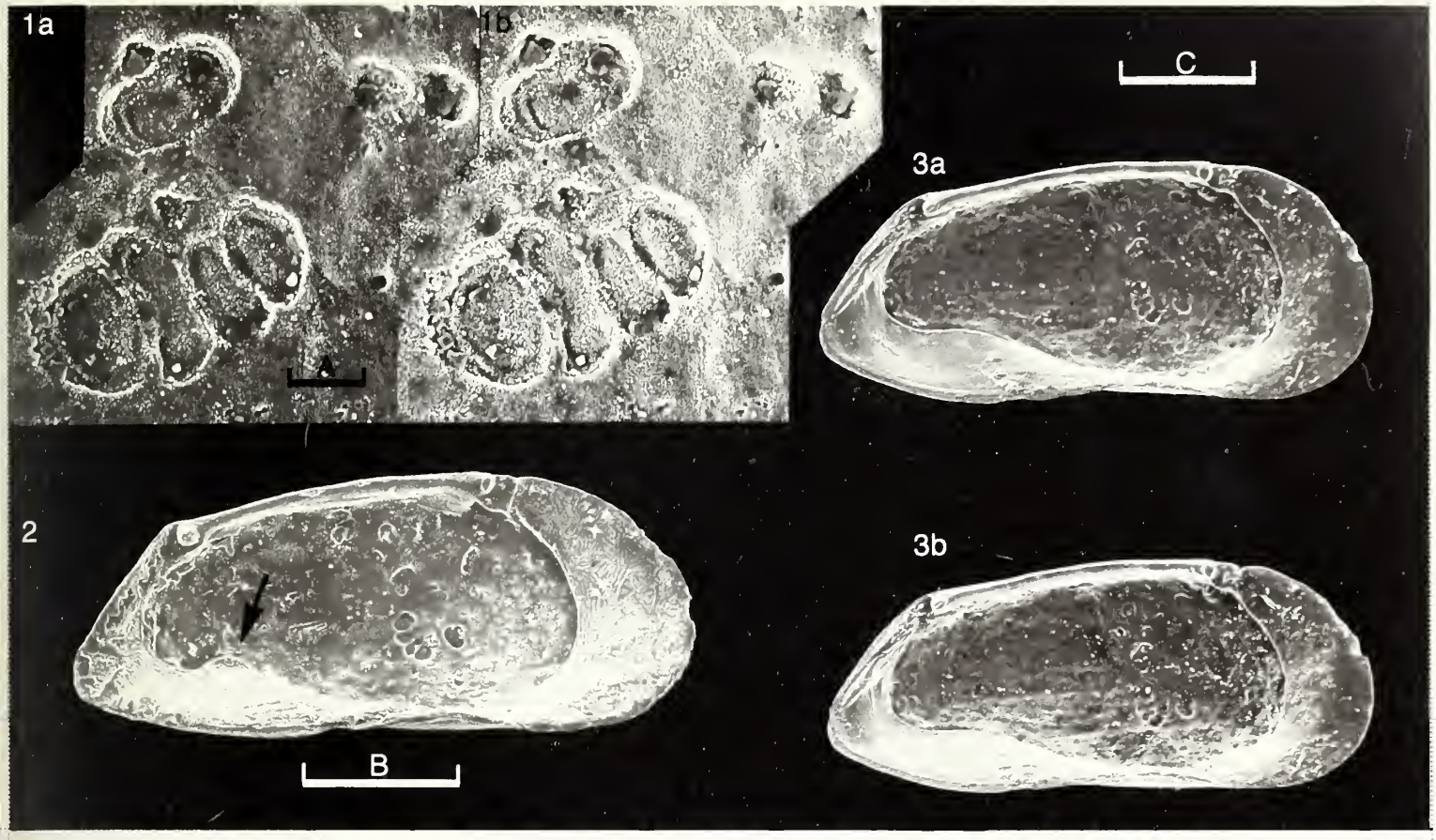
Distribution: *Gambiella caelata* is only known from its type locality.

Acknowledgement: The 'Workgroep Electronenmicroscopie' of the University of Amsterdam is acknowledged for the use of their Cambridge Mk. II stereoscan.

Explanation of Plate 12, 148

Fig. 1, car., vent. (paratype, **K 6549**, 435 μm long); fig. 2, car., dors. (paratype, **K 6550**, 440 μm long).

Scale A (100 μm; $\times$215), figs. 1, 2.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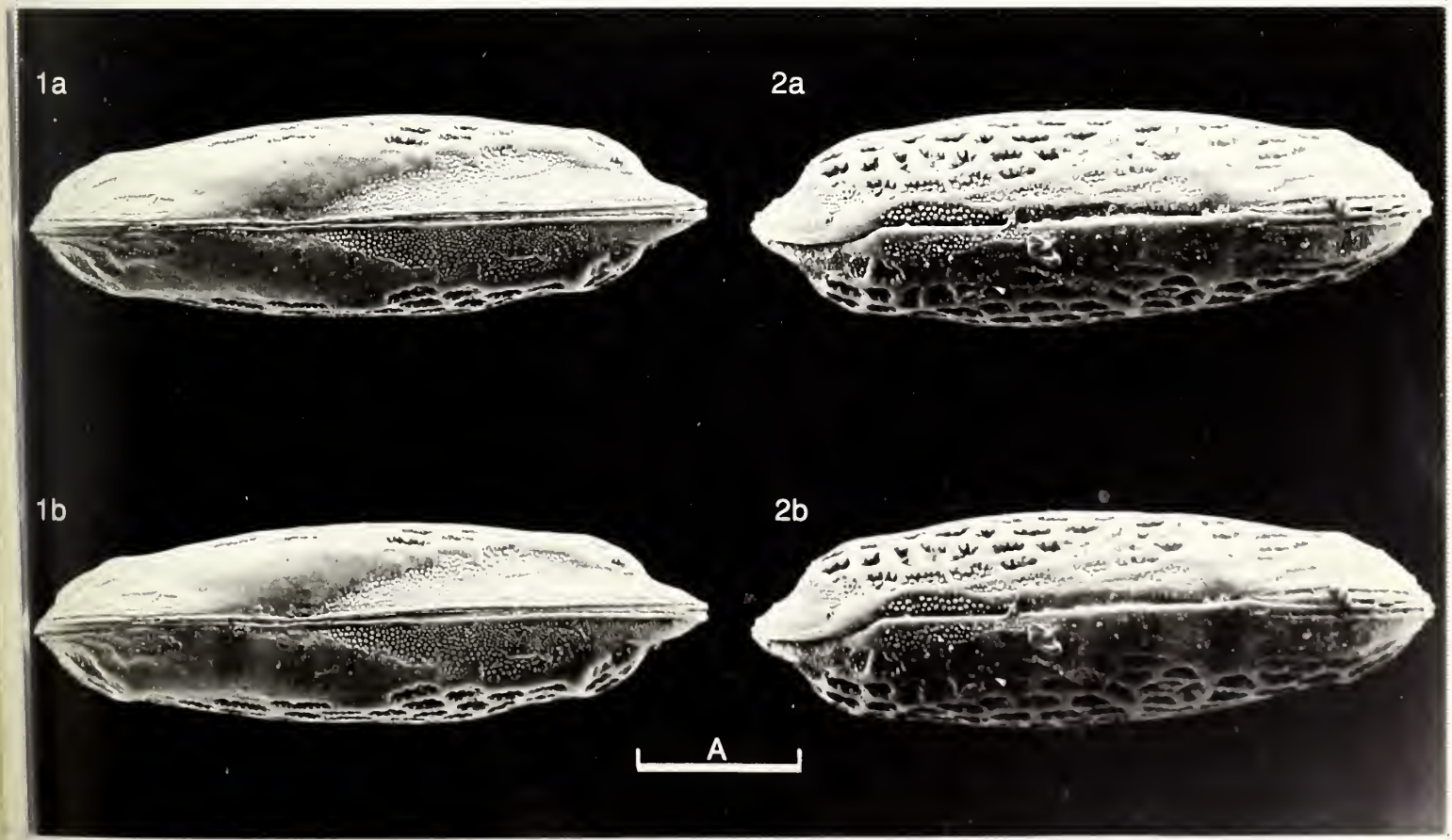
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A

595.336.13 (113.313) (415 : 162.007.53 + 430.1 : 161.008.54 + 485 : 161.018.57) : 551.35

ON *GOTULA GOTLANDICA* (SCHALLREUTER)

by R. E. L. Schallreuter & R. J. Orr
(University of Hamburg, West Germany & Queen's University of Belfast, Northern Ireland)

Genus *GOTULA* gen. nov.

Type-species: *Gellensia gotlandica* Schallreuter, 1967

Derivation of name: An abbreviated combination of the type-species name and 'botulus' (i.e. the dolon is non-loculate).

Diagnosis: Sulcus a tear drop shaped sulcal depression. Preadductorial node a strong bulb. Velar frill restricted, terminates posteroventrally with a large, hollow spine. Velum diverges from free margin posteriorly. Dolon forms a discrete, strongly convex, sausage-shaped, false brood pouch.

Remarks: *Gotula* belongs within the subfamily Ampletochilininae Schallreuter, 1975. The genus is characterized by the distinct preadductorial node and the shortened velar frill which is clearly oblique to the free margin in ventral view. A distinct preadductorial node is also present in *Gellensia* Schallreuter, 1967, *Moeckowia* Schallreuter, 1964 and *Cystomatochilina* Jaanusson, 1957. In these three genera the velar frill is subparallel to the free margin. In *Gellensia* (see *G. nodoreticulata* Schallreuter, *Stereo-Atlas Ostracod Shells* **9**, 105-108, 1982) the dolon is less convex and is located ventrally rather than anteroventrally.

Cystomatochilina and *Moeckowia* were derived from *Platybolbina* in the middle Ordovician (R. E. L. Schallreuter, *Palaeontographica* (A) **149**, 153, 154, 1975). The genus *Gotula* has possibly been derived from *Platybolbina (Abruptobolbina)* Schallreuter (*Geologie*, **18**, 877, 1969) in the upper Ordovician, as shown by the young instar (Pl. **12**, 156, fig. 3) which clearly resembles *Platybolbina* in many respects (muscle spot, flat preadductorial node, reticulation, corner areas free of reticulation).

Distribution: *Gotula* is known from the Ordovician Ashgill Series of Baltoscandia and Ireland.

Explanation of Plate 12, 150

Figs. 1, 3, posterodorsally and ventrally incomplete ♀ RV (**K 10020**, 1.29 mm long): fig. 1, ext. lat.; fig. 3, ext. vent. Fig. 2, post. half of ♀ RV, vent. obl. (**K 10021**, 1.09 mm long). Scale A (250 μm; × 55), figs. 1, 3; scale B (250 μm; × 70), fig. 2.

Gotula gotlandica (Schallreuter, 1967)

1967 *Gellensia gotlandica* sp.n.; R. E. L. Schallreuter, *Geologie*, **16** (5), 618, 619, fig. 2.
1975 *Gellensia gotlandica* Schallreuter; R. E. L. Schallreuter, *Palaeontographica* (A), **149** (4/6), 156, 157.
1982 *Gellensia gotlandica* Schallreuter; R. E. L. Schallreuter, *Stereo-Atlas Ostracod Shells*, **9**, 107.

Holotype: Sektion Geologische Wissenschaften, University of Greifswald, German Democratic Republic; no. **25/2**, larval LV.

Type locality: North beach of Visby, Isle of Gotland, Baltic Sea; lat. 57° 40′N, long. 18° 18.5′E; Öjlemyrflint erratic boulder, no. G2; upper Ordovician.

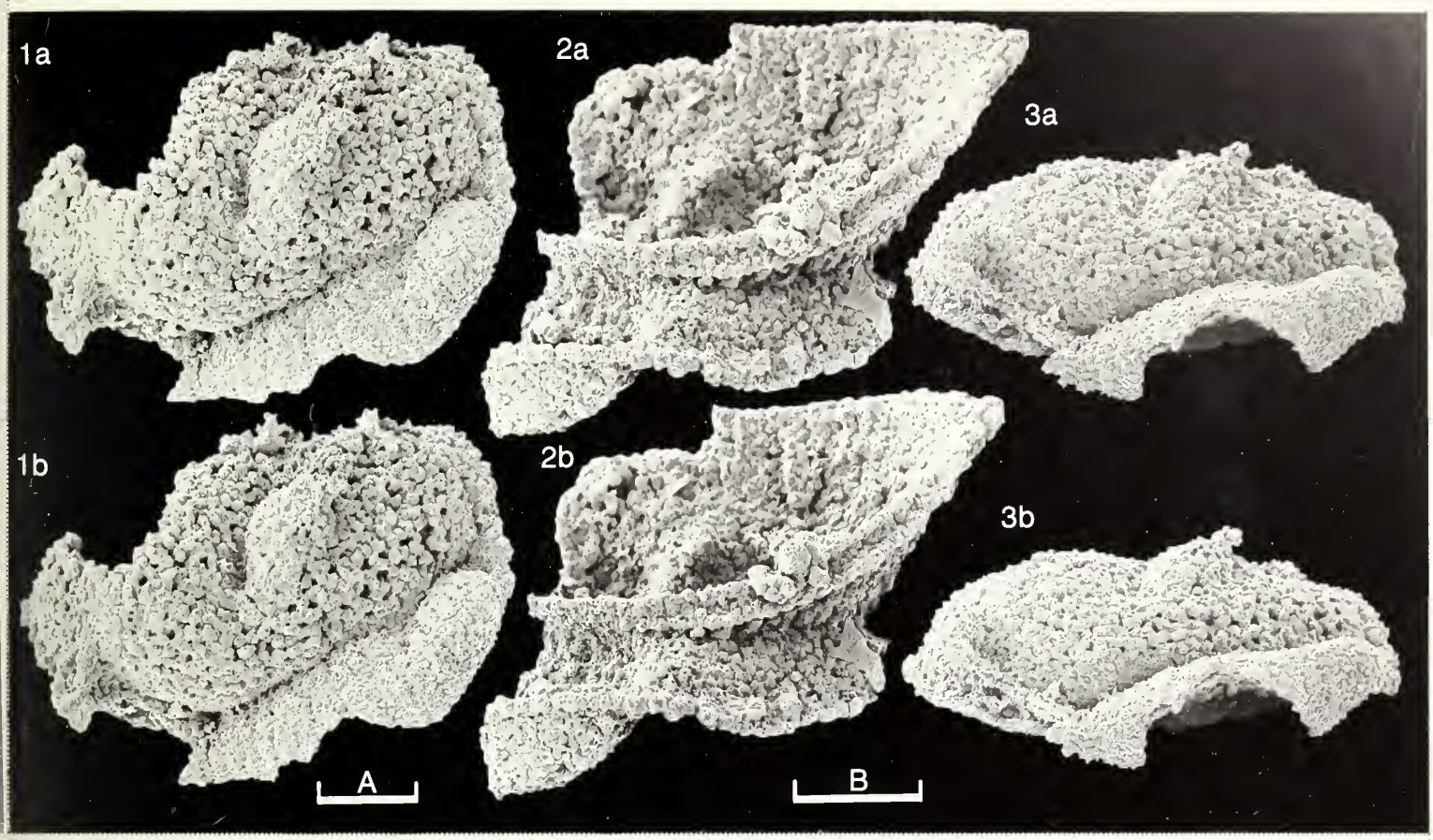
Figured specimens: Ulster Museum, Belfast, nos. **K 10020** (♀ RV: Pl. **12**, 150, figs. 1, 3), **K 10021** (♀ RV: Pl. **12**, 150, fig. 2; Pl. **12**, 152, fig. 1), **K 10022** (♀ RV: Pl. **12**, 152, fig. 2) and **K 10023** (tecnomorphic RV: Pl. **12**, 152, figs. 3, 4). Specimens **K 10020**, **K 10021**, **K 10023** from Bed 7, locality CN; **K 10022** from Bed 9, locality F. All from the Lower Limestones Member, Portrane Limestone, near Dublin, Ireland; approx. lat. 53° 29′N, long. 6° 06′W. For locality details see R. J. Orr, *Stereo-Atlas Ostracod Shells*, **12**, 61, and text-fig. 1.

Geologisch-Paläontologisches Institut und Museum, University of Hamburg (**GPIMH**), nos. **3258** (tecnomorphic LV: Pl. **12**, 154, figs. 1-3), **3259** (juv. RV: Pl. **12**, 154, fig. 4; Pl. **12**, 156, fig. 3), **3260** (tecnomorphic LV: Pl. **12**, 156, fig. 1) and **3261** (tecnomorphic RV: Pl. **12**, 156, fig. 2). Nos. **3258**, **3260**, **3261** are from the upper Harjuan (upper Ordovician) Öjlemyrflint erratic boulder no. G287 from the beach at Vale, NW Gotland, Baltic Sea; approx. 57° 48′N, 18° 26′E; coll. by Schallreuter, 1976. No. **3259** is from the Öjlemyrflint erratic boulder no. Sy104 of the Upper Kaolinsand (Lower Pleistocene) near Braderup, Isle of Sylt, N Frisian Is., N Sea; approx. 54° 56′N, 8° 21′E; coll. by Ulrich von Hacht, 1980.

Diagnosis: Length of adults up to 1.42mm. Sausage-shaped anteroventral dolon; posterior and anterior of dolon velar frill straight and normal, as in tecnomorphs; posteriorly velum as a small bulge with a row of short spines. Marginal sculpture in right valve is a ridge; left valve with a ridge and a row of marginal spines posteroventrally. Surface spinose; some specimens show relict stellate reticulation.

Explanation of Plate 12, 152

Fig. 1, post. half of ♀ RV, int. obl. (**K 10021**): fig. 2, ♀ RV with anterodorsally incomplete velum, ext. lat. (**K 10022**, 1.15 mm long); figs. 3, 4, tecnomorphic RV (**K 10023**, 1.21 mm long); fig. 3, int. obl.; fig. 4, int. vent.
Scale A (250 μm; × 70), fig. 1; scale B (250 μm; × 60), figs. 2-4.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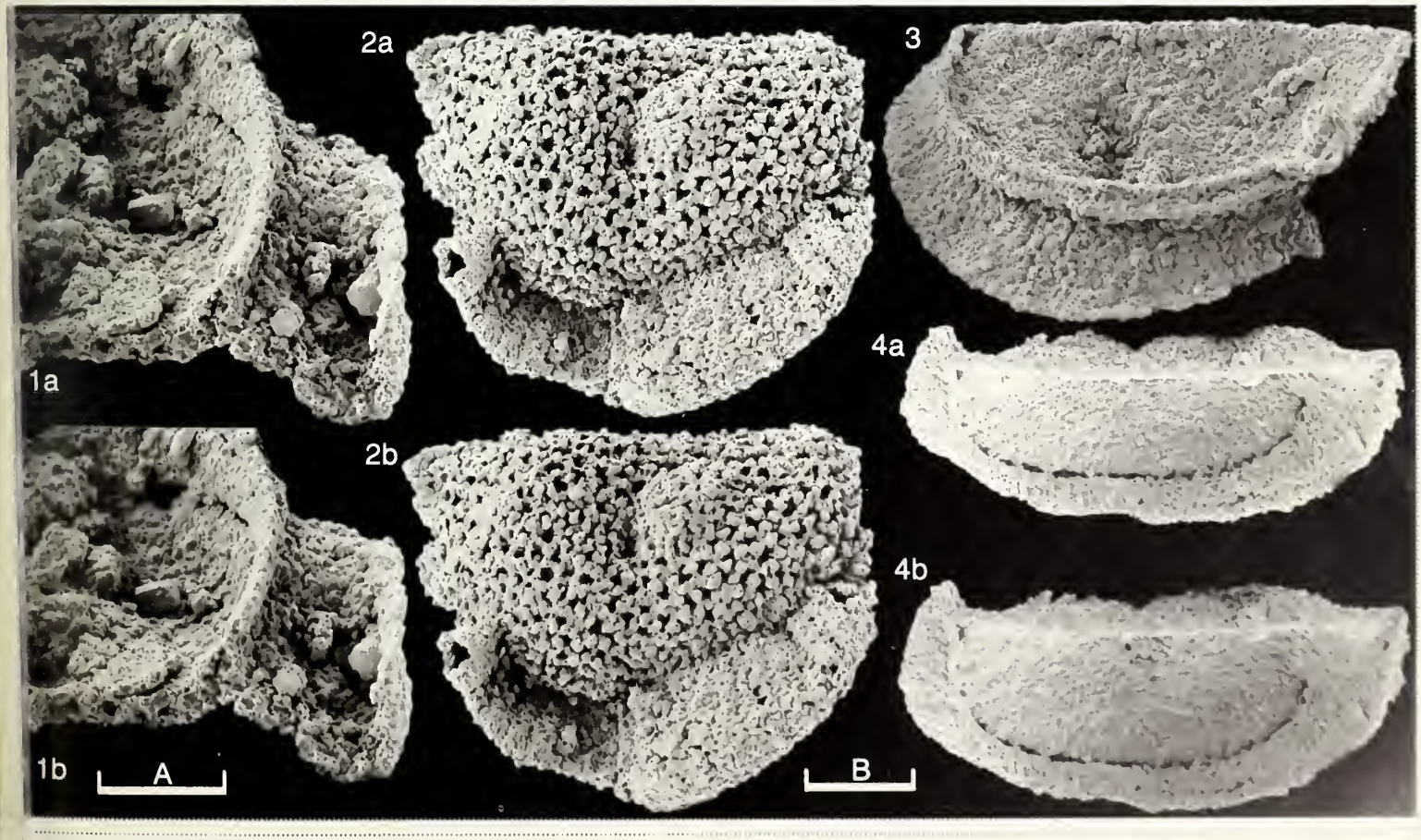
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Remarks: The Öjlemyrflint material is preserved as CaF_2 pseudomorphs. They were gained by treatment with HF (Wetzel's method; see R. E. L. Schallreuter, *in*: R. H. Bate *et al.* (Eds.), *Fossil and Recent Ostracods*, 171, 1982, Ellis Horwood, Chichester) from cherts in which the calcareous microfossils are still preserved as calcareous (Gotland material) or secondarily silicified valves (Sylt material). The material from Portrane is coarsely silicified and, therefore, the fine details of the ornament and the contact margin (for example the left valve marginal spines) are obscured. Furthermore, due to this secondary increase in shell thickness the lobal features are exaggerated; thus, the sulcus appears to be deeper and almost fissum-like in character and the velum seems to comprise a double-walled outfold of the shell wall with a corresponding internal fissure. By contrast, in better Portrane specimens and in good Öjlemyrflint specimens the velum can be seen to comprise a row of contiguous hollow tubules.

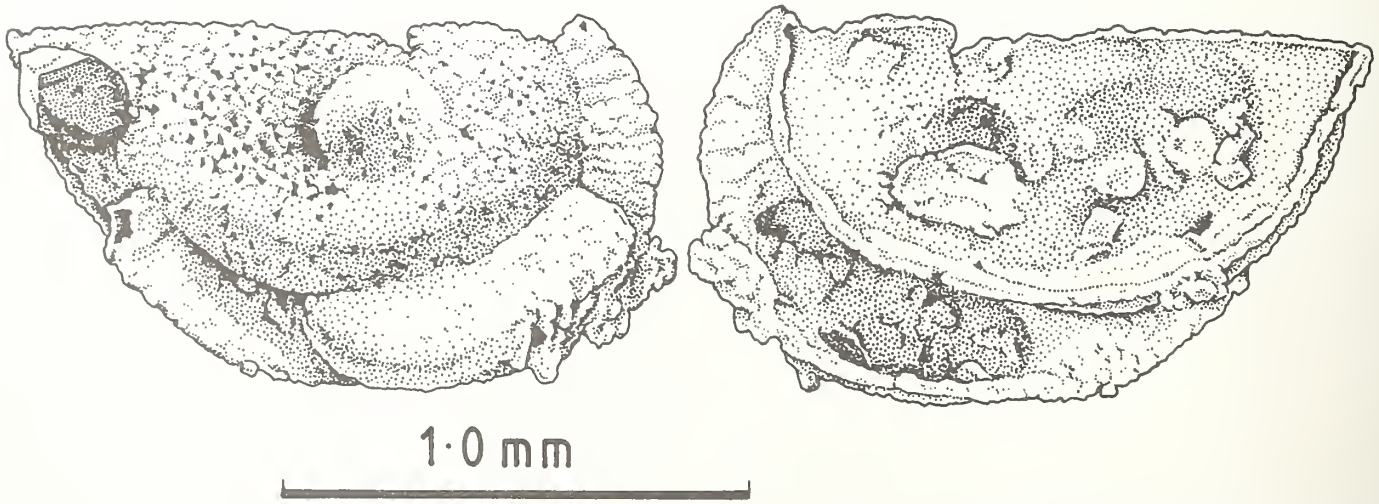
In some specimens a vestigial reticulation can be observed. This is more clearly seen in the Öjlemyrflint material (Pl. **12**, 156, fig. 2), but can also be seen in the Portrane material (Pl. **12**, 152, fig. 2). The stellate pattern recalls that present in *Moeckowia moeckowbergensis* Schallreuter, 1964 (R. E. L. Schallreuter, *Palaeontographica* (A) **180**, pl. 13, fig. 3, 1983). A vestigial stellate reticulation was also noted in *Platybolbina (Rimabolbina) rima* Schallreuter, 1964 (R. E. L. Schallreuter, *op. cit.*, **149**, pl. 11, fig. 1, 1975) but this species, like *M. moeckowbergensis*, has a fissum rather than a shallower sulcal depression. The main part of the fissum of *M. moeckowbergensis* lies within the shell, which is reticulate in the other parts of the lateral surface (shell reticulation: see R. E. L. Schallreuter & C. R. Jones, *Neus. Jb. Geol. Paläont. Mh.*, 422, 1984). The same conditions seem to occur in *Gotula gotlandica*, in which the fissum is formed by surrounding spines (Pl. **12**, 154, fig. 1) and in which the top of the stellate spines (which are mostly broken away) represent the equivalent of the cross-points of the reticulation of *M. moeckowbergensis*.

Explanation of Plate 12, 154

Figs. 1-3, tecnomorphic LV (**GPIMH 3258**, 1.34 mm long): fig. 1, ext. lat.; fig. 2, ext. vent.; fig. 3, ext. vent., detail of post. adventral sculptures; fig. 4, juv. RV, ext. lat., detail of ornament and broken velar frill (**GPIMH 3259**).
Scale A (250 μm; $\times$55), figs. 1, 2; scale B (100 μm; $\times$100), fig. 3; scale C (50 μm; $\times$250), fig. 4.

Distribution: Portrane, near Dublin, Ireland: limestone boulder in mud flow in upper part of Calcareous tuffs and lahars, and from the Portrane Limestone (Lower Limestones Member, Main Limestones Member, Upper Limestones Member); Pusgillian ? to Lower Rawtheyan, Ashgill Series.

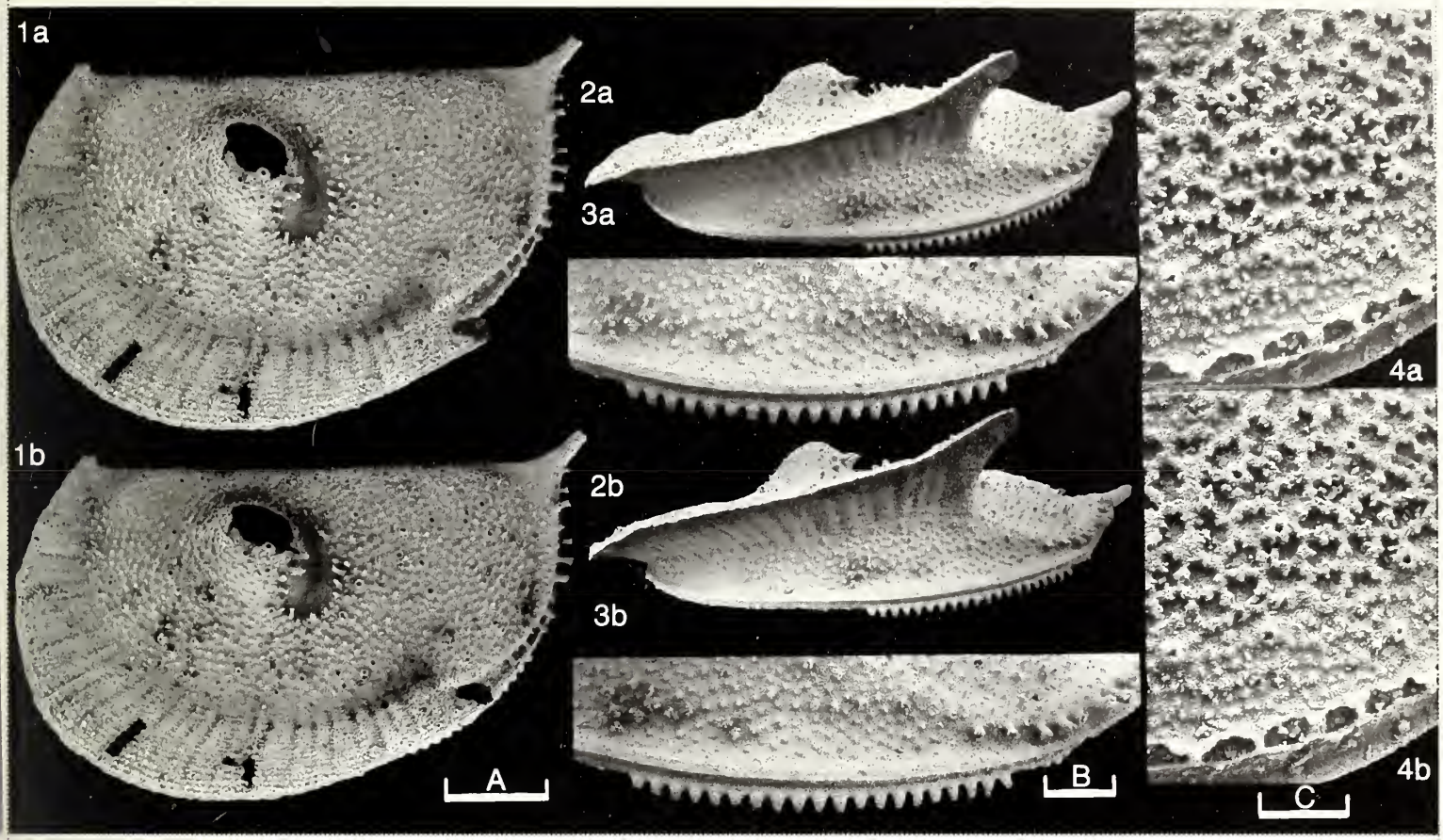
Also present in the Öjlemyrflint erratic boulders of the Isle of Gotland, Baltic Sea, and of the Kaolinsand (lower Pleistocene) of the Isle of Sylt, N Sea; Pirgu- (F_1c) or Porkuni-Stage (F_2), upper Harjuan (Ashgill Series).



Text-fig. 1. ♀ RV of *Gotula gotlandica*: ext. lat. and int. lat. of specimen **K 10021** (1420 μm long). Specimen broken after study.

Explanation of Plate 12, 156

Fig. 1, tecnomorphic LV, ext. lat. (**GPIMH 3260**, 1.12 mm long excluding spines); fig. 2, partly incomplete tecnomorphic RV, ext. lat. (**GPIMH 3261**, 1.24 mm long excluding spines); fig. 3, juv. RV, ext. lat. (**GPIMH 3259**, 0.63 mm long; velum incomplete).
Scale A (250 μm; $\times$70), fig. 1; scale B (250 μm; $\times$62), fig. 2; scale C (100 μm; $\times$85), fig. 3.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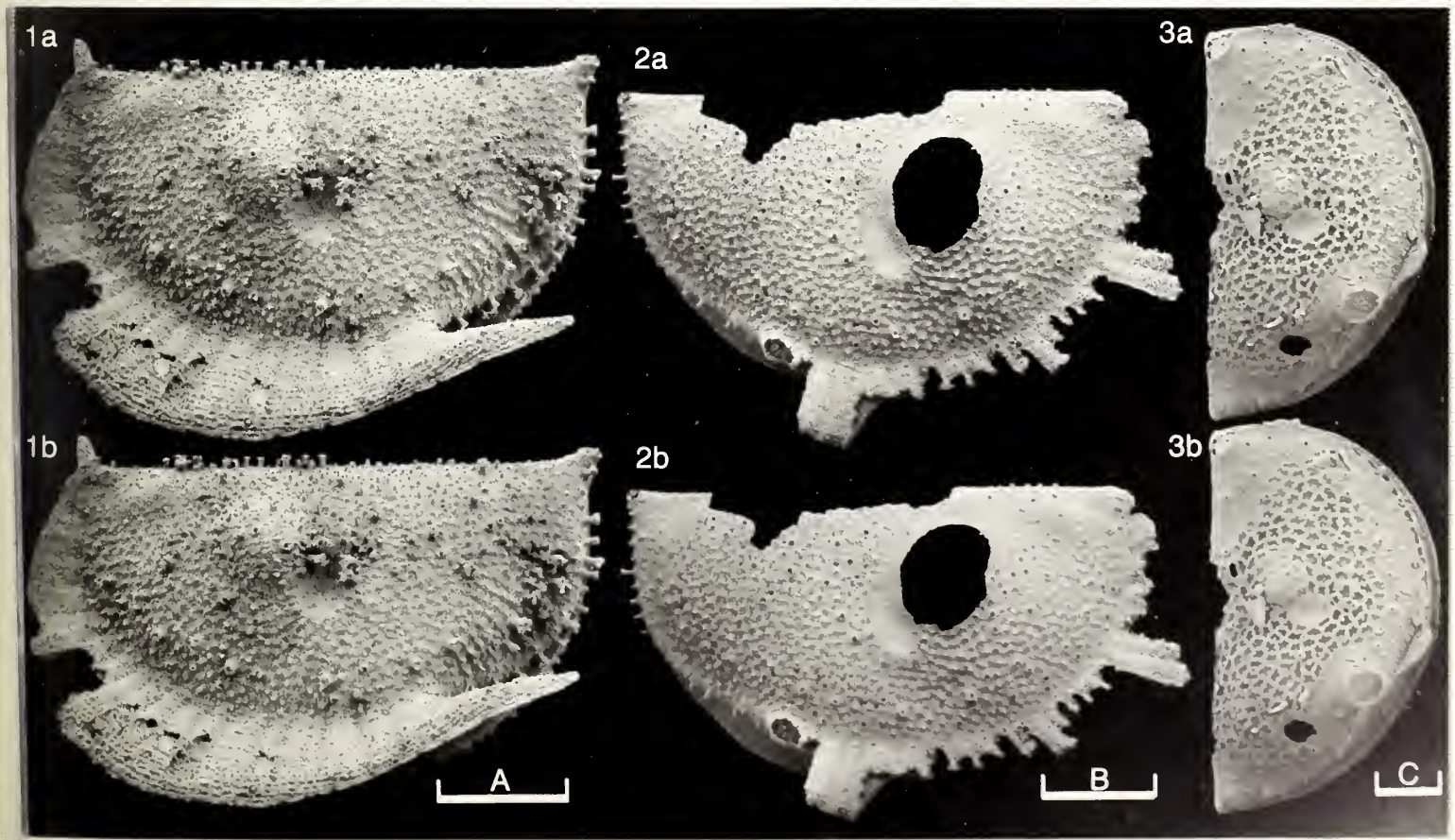
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595.337.14 (119.9 + 119.1) (261.27 : 162.006.54 + 420.162 : 001.50) : 551.35

ON *LOXOCONCHA MALCOMSONI* HORNE & ROBINSON nom. nov.

by David J. Horne & Eric Robinson
(City of London Polytechnic & University College London, England)

Loxoconcha malcomsoni nom. nov.

1886 *Lopoconcha cuneiformis* (*sic*) n.sp. Brady MS; S. M. Malcomson, *Rep. Proc. Belf. Nat. Fld Club*, appendix 1884-1885, 261, pl. 25, figs. 1, 2.

non 1885 *Loxoconcha cuneiformis* sp. nov. Terquem, *Mem. Soc. géol. Fr.* (ser. 3), **4**, 35, pl. 5, figs. 15a-b.

1982 *Loxoconcha cuneiformis* Malcolmson (*sic*); D. J. Horne and E. Robinson, *Stereo-Atlas of Ostracod Shells*, **9**, 21-26.

Remarks: We are grateful to Dr. E. Kempf (University of Cologne) for pointing out to us that *Loxoconcha cuneiformis* Malcomson (see Horne & Robinson, *op. cit.*) is preoccupied by a species described by Terquem (*op. cit.*), and for drawing our attention to the correct spelling of Malcomson. We therefore propose the new name *Loxoconcha malcomsoni* for Malcomson's species.

595.337.14 (118.22 + 119 + 119.9) (261.26 : 161.001.55 + 261.28 + 420) : 551.351

ON *PALMOCONCHA LAEVATA* (NORMAN)

by David J. Horne & Robin C. Whatley
(City of London Polytechnic & University College of Wales, Aberystwyth)

Palmoconcha laevata (Norman, 1865)

1865 *Cythere laevata* sp. nov. A. M. Norman, Report on the Crustacea, *in*: G. S. Brady (Ed.), Reports of deep-sea dredging on the coasts of Northumberland and Durham, 1862-1864. *Nat. Hist. Trans. Northumberland and Durham*, **1** (1865-1867). (1), 18, pl. 5, figs. 13-16.

1981 *Lindisfarnia laevata* (Norman); D. J. Horne & T. I. Kilenyi, *Stereo-Atlas of Ostracod Shells*, **8**, 107-116 (q.v. for more extensive synonymy).

Remarks: Horne & Kilenyi (*op. cit.*) designated *Cythere laevata* Norman the type-species of their new genus *Lindisfarnia*. We have recently been able to compare *C. laevata* with a lectotype of *Palmoconcha laevimarginata* Swain & Gilby, 1974 (kindly provided by Prof. Swain), which is the type-species of *Palmoconcha* Swain & Gilby, 1974 (*Micropalaeontology*, **20**, 325). In view of the close similarity of their carapace features, particularly the hinge and muscle-scars, we are convinced that they are congeneric. *Lindisfarnia* must therefore be regarded as a junior synonym of *Palmoconcha*, and all the species so far assigned to *Lindisfarnia* (see Athersuch & Horne, *Stereo-Atlas Ostracod Shells*, **8**, 117-124, 1981 and *Zool. J. Linn. Soc.*, **81**, 1-22, 1984) must be reassigned to *Palmoconcha*.

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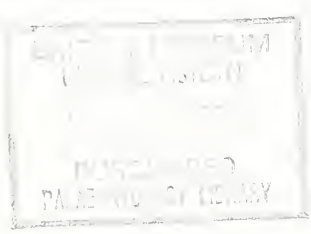

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